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MEASURES TO STRENGTHEN INTERNATIONAL CO-OPERATION IN NUCLEAR, RADIATION AND WASTE SAFETY

1. This document, which may be regarded as a successor to document GC(41)/INF/8 (issued last September) and its predecessors, presents an overview of measures to strengthen international co-operation in nuclear, radiation and waste safety. It focuses on recent Agency activities concerned with such measures, but also touches on a number of important initiatives taken outside the Agency. Some of the activities during 1997 are discussed in other General Conference documents, notably the Agency's Annual Report (GC(42)/5) and the Nuclear Safety Review for the Year 1997 (GC(42)/INF/6). This document is therefore also intended to provide supplementary information, such as more detailed accounts of specific subjects and updates on activities in the first half of 1998.

2. The Attachment to this document on recent Agency activities follows a similar general pattern to that adopted in 1997, whereby activities were reported in three main areas:

A. Legally binding international safety agreements such as various conventions which have been adopted or are still being developed;

B. Non-binding international safety standards which have been developed mainly under the auspices of the Agency; and

C. Provisions for the application of those standards.

3. Part A of the Attachment deals with:

- the status of, and recent developments concerning, the *Convention on the Physical Protection of Nuclear Material*, the *Convention on Early Notification of a Nuclear Accident* and the *Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency*;

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- the implementation activities following the entry into force of the *Convention on Nuclear Safety* (information on which was requested in General Conference resolution GC(41)/RES/10); and
- the adoption of the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management* and subsequent activities related thereto.

4. Part B of the Attachment concerns the *establishment of non-binding international safety standards* by the Agency, often in collaboration with specialized agencies of the United Nations and with other international bodies, and describes the operation of the Secretariat's strengthened process for safety standards preparation and review.

5 Part C of the Attachment describes how the Agency has been *providing for the application of safety standards* through:

- the provision of safety-related assistance under the Agency's technical co-operation (TC) programmes and by other means;
- the fostering of safety-related information exchange; and
- the rendering of safety-related services.

6. In Part C, Annex C-1 describes recent developments in the *provision of safety related assistance through TC programmes* and Annex C-2 deals with two particular areas of safety related assistance; the *provision of assistance related to the safety of nuclear power plants in countries of eastern Europe and the former Soviet Union and in countries of south-east Asia, the Pacific and the FarEast*. Annex C-3 describes recent efforts to *foster safety related information exchange* and Annexes C-4 and C-5 address two important aspects of such information exchange; *the promotion of education and training in nuclear, radiation and waste safety* and *the co-ordination of safety related research and development*, respectively. Annex C-6 describes the status of a number of *safety related services* rendered by the Agency to Member States.

7. A paper summarizing the main conclusions from the International Conference on Topical Issues in Nuclear, Radiation and Waste Safety, due to be held in Vienna from 31 August to 4 September 1998 (see Annex C-3 to Part C of the Attachment), will be issued as an Addendum to this document.

PART A

LEGALLY BINDING INTERNATIONAL SAFETY AGREEMENTS

Background

1. Four legally binding international safety agreements aimed at strengthening international co-operation in nuclear, radiation and waste safety have been developed and adopted by the international community and are now being implemented by the parties to them, with the support of the Agency[1]:

- the *Convention on the Physical Protection of Nuclear Material* (which was opened for signature on 3 March 1980 and entered into force on 8 February 1987);
- the *Convention on Early Notification of a Nuclear Accident* (which was opened for signature on 26 September 1986 and entered into force on 27 October 1986);
- the *Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency* (which was opened for signature on 26 September 1986 and entered into force on 26 February 1987); and
- the *Convention on Nuclear Safety* (which was opened for signature on 20 September 1994 and entered into force on 24 October 1996).

2. Another such agreement — the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management* — was opened for signature on 29 September 1997 and has not yet entered into force. The present situation

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1 Two other conventions for which the Director General performs depositary functions are the Vienna Convention on Civil Liability for Nuclear Damage (and the Protocol to Amend the Vienna Convention) and the Convention on Supplementary Compensation for Nuclear Damage. The subject of liability for nuclear damage is dealt with in another document being prepared for the General Conference.

regarding these various conventions is described below. Up to date information on the status of the Conventions is also available on WorldAtom, the Agency's site on the World Wide Web, at www.iaea.org/worldatom/glance/legal/.

3. The IAEA's Director General is designated as depositary for each of these Conventions. In addition, the Conventions assign other tasks to the Agency's Secretariat; these include the collection and dissemination of information and the provision of assistance in the event of nuclear accidents or radiological emergencies. A report on the Secretariat's experiences in carrying out its functions in relation to the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency will be presented to the December 1998 session of the Board of Governors.

Convention on the Physical Protection of Nuclear Material (INFCIRC/274/Rev. 1)

4. Since the last session of the General Conference, four States — Cuba, Lebanon, the Republic of Moldova and Uzbekistan — have acceded to the Convention and Bosnia and Herzegovina has succeeded to the Convention with retrospective effect from 1 March 1992. As of 30 June 1998, therefore, there were 62 parties to the Convention; 61 States and EURATOM. These are listed in the following table, which also shows the other signatories to the Convention, and other non-parties that have made know to the IAEA Secretariat their contact points for the purposes of the Convention.

CONVENTION ON THE PHYSICAL PROTECTION OF NUCLEAR MATERIAL (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Antigua and Barbuda[b]		1993-08-04	1993-09-03	No
Argentina	1986-02-28	1989-04-06	1989-05-06	Yes
Armenia		1993-08-24	1993-09-23	Yes
Australia	1984-02-22	1987-09-22	1987-10-22	Yes
Austria	1980-03-03	1988-12-22	1989-01-21	Yes
Bangladesh				Yes
Belarus		1993-09-09	1993-06-14[c]	Yes
Belgium	1980-06-13	1991-09-06	1991-10-06	Yes
Bosnia and Herzegovina		1998-06-30	1992-03-01[c]	No

CONVENTION ON THE PHYSICAL PROTECTION OF NUCLEAR MATERIAL (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Brazil	1981-05-15	1985-10-17	1987-02-08	Yes
Brunei Darussalam[b]				Yes
Bulgaria	1981-06-23	1984-04-10	1987-02-08	Yes
Canada	1980-09-23	1986-03-21	1987-02-08	Yes
Cape Verde[b]				Yes
Chile		1994-04-27	1994-05-27	Yes
China		1989-01-10	1989-02-09	Yes
Colombia				Yes
Croatia		1992-09-29	1991-10-08[c]	Yes
Cuba		1997-09-26	1997-10-26	No
Czech Republic		1993-03-24	1993-01-01[c]	Yes
Denmark	1980-06-13	1991-09-06	1991-10-06	Yes
Dominica[b]				Yes
Dominican Republic	1980-03-03			No
Ecuador	1986-06-26	1996-01-17	1996-02-16	Yes
Estonia		1994-05-09	1994-06-08	No
Finland	1981-06-25	1989-09-22	1989-10-22	Yes
France	1980-06-13	1991-09-06	1991-10-06	Yes
Germany	1980-06-13	1991-09-06	1991-10-06	Yes
Greece	1980-03-03	1991-09-06	1991-10-06	Yes
Guatemala	1980-03-12	1985-04-23	1987-02-08	No
Haiti	1980-04-09			No
Holy See				Yes
Hungary	1980-06-17	1984-05-04	1987-02-08	Yes
Indonesia	1986-07-03	1986-11-05	1987-02-08	Yes
Iran, Islamic Republic of				Yes
Ireland	1980-06-13	1991-09-06	1991-10-06	Yes
Israel	1983-06-17			No
Italy	1980-06-13	1991-09-06	1991-10-06	Yes
Japan		1988-10-28	1988-11-27	Yes
Jordan				Yes
Kazakhstan				Yes

CONVENTION ON THE PHYSICAL PROTECTION OF NUCLEAR MATERIAL (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Kenya				Yes
Korea, Republic of	1981-12-29	1982-04-07	1987-02-08	Yes
Kuwait				Yes
Lebanon		1997-12-16	1998-01-15	No
Liechtenstein	1986-01-13	1986-11-25	1987-02-08	Yes
Lithuania		1993-12-07	1994-01-06	Yes
Luxembourg	1980-06-13	1991-09-06	1991-10-06	Yes
Malta				Yes
Mexico		1988-04-04	1988-05-04	Yes
Monaco		1996-08-09	1996-09-08	Yes
Mongolia	1986-01-23	1986-05-28	1987-02-08	No
Morocco	1980-07-25			No
Netherlands	1980-06-13	1991-09-06	1991-10-06	Yes
Niger	1985-01-07			Yes
Norway	1983-01-26	1985-08-15	1987-02-08	Yes
Panama	1980-03-18			No
Papua New Guinea[b]				Yes
Paraguay	1980-05-21	1985-02-06	1987-02-08	Yes
Peru		1995-01-11	1995-02-10	Yes
Philippines	1980-05-19	1981-09-22	1987-02-08	Yes
Poland	1980-08-06	1983-10-05	1987-02-08	Yes
Portugal	1984-09-19	1991-09-06	1991-10-06	Yes
Republic of Moldova		1998-05-07	1998-06-07	Yes
Romania	1981-01-15	1993-11-23	1993-12-23	Yes
Russian Federation	1980-05-22	1983-05-25	1987-02-08	Yes
Slovakia		1993-02-10	1993-01-01[c]	Yes
Slovenia		1992-07-07	1991-06-25[c]	Yes
South Africa	1981-05-18			No
Spain	1986-04-07	1991-09-06	1991-10-06	Yes
Sri Lanka				Yes
Sweden	1980-07-02	1980-08-01	1987-02-08	Yes
Switzerland	1987-01-09	1987-01-09	1987-02-08	Yes

CONVENTION ON THE PHYSICAL PROTECTION OF NUCLEAR MATERIAL (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Tajikistan[b]		1996-07-11	1996-08-10	No
The Former Yugoslav Republic of Macedonia		1996-09-20	1991-11-17[c]	No
Tonga[b]				Yes
Tunisia		1993-04-08	1993-05-08	No
Turkey	1983-08-23	1985-02-27	1987-02-08	Yes
Ukraine		1993-07-06	1993-08-05	Yes
United Kingdom	1980-06-13	1991-09-06	1991-10-06	Yes
United States of America	1980-03-03	1982-12-13	1987-02-08	Yes
Uruguay				Yes
Uzbekistan		1998-02-09	1998-03-11	No
Yugoslavia	1980-07-15	1986-05-14	1987-02-08	No
EURATOM	1980-06-13	1991-09-06	1991-10-06	Yes

[a] Instrument of ratification, accession, acceptance, etc.

[b] Not a Member State of the IAEA.

[c] Effective date of entry into force.

Convention on Early Notification of a Nuclear Accident (INFCIRC/335)

5. The Convention has not been formally invoked in the period since the last session of the General Conference. Spain provided information to the Agency in June 1998 concerning a release of ^{137}Cs from a steel mill in Algeciras, although the incident did not require formal notification under the terms of the Convention.

6. Three States — Myanmar, the Republic of Moldova and Singapore — have acceded to the Convention since the last session of the General Conference, and Bosnia and Herzegovina has succeeded to the Convention with retrospective effect from 1 March 1992. As of 30 June 1998, there were 82 parties to the Convention; 79 States and 3 organizations). These are listed in the following table, which also shows the other signatories to the Convention, and other non-parties that have made know to the IAEA Secretariat their contact points for the purposes of the Convention.

CONVENTION ON EARLY NOTIFICATION OF A NUCLEAR ACCIDENT (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Afghanistan	1986-09-26			No
Albania				Yes/U[d]
Algeria	1987-09-24			Yes
Andorra[b]				Yes/U[d]
Argentina		1990-01-17	1990-02-17	Yes
Armenia		1993-08-24	1993-09-24	Yes
Australia	1986-09-26	1987-09-22	1987-10-23	Yes
Austria	1986-09-26	1988-02-18	1988-03-20	Yes
Bangladesh		1988-01-07	1988-02-07	Yes
Belarus	1986-09-26	1987-01-26	1987-02-26	Yes
Belgium	1986-09-26			Yes
Belize[b]				Yes
Bolivia				Yes
Bosnia and Herzegovina		1998-06-30	1992-03-01[c]	Yes
Brazil	1986-09-26	1990-12-04	1991-01-04	Yes
Brunei Darussalam[b]				Yes
Bulgaria	1986-09-26	1988-02-24	1988-03-26	Yes
Cameroon	1987-09-25			Yes
Canada	1986-09-26	1990-01-18	1990-02-18	Yes
Cape Verde[b]				Yes
Chile	1986-09-26			Yes
China	1986-09-26	1987-09-10	1987-10-11	Yes
Colombia				Yes
Costa Rica	1986-09-26	1991-09-16	1991-10-17	Yes
Côte d'Ivoire	1986-09-26			Yes
Croatia		1992-09-29	1991-10-08[c]	Yes
Cuba	1986-09-26	1991-01-08	1991-02-08	Yes
Cyprus		1989-01-04	1989-02-04	Yes
Czech Republic		1993-03-24	1993-01-01[c]	Yes
DPR Korea[b]	1986-09-29			Yes
Democratic Republic of the Congo	1986-09-30			Yes

CONVENTION ON EARLY NOTIFICATION OF A NUCLEAR ACCIDENT (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Denmark	1986-09-26	1986-09-26	1986-10-27	Yes
Dominica[b]				Yes
Dominican Republic				Yes/U[d]
Ecuador				Yes
Egypt	1986-09-26	1988-07-06	1988-08-06	Yes
Estonia		1994-05-09	1994-06-09	Yes
Ethiopia				Yes
Finland	1986-09-26	1986-12-11	1987-01-11	Yes
France	1986-09-26	1989-03-06	1989-04-06	Yes
Gabon				Yes
Georgia				Yes/U[d]
Germany	1986-09-26	1989-09-14	1989-10-15	Yes
Ghana				Yes
Greece	1986-09-26	1991-06-06	1991-07-07	Yes
Grenada[b]				Yes
Guatemala	1986-09-26	1988-08-08	1988-09-08	Yes
Guinea-Bissau[b]				Yes
Haiti				Yes/U[d]
Holy See	1986-09-26			Yes
Hungary	1986-09-26	1987-03-10	1987-04-10	Yes
Iceland	1986-09-26	1989-09-27	1989-10-28	Yes
India	1986-09-29	1988-01-28	1988-02-28	Yes
Indonesia	1986-09-26	1993-11-12	1993-12-13	Yes
Iran, Islamic Republic of	1986-09-26			Yes
Iraq	1987-08-12	1988-07-21	1988-08-21	Yes
Ireland	1986-09-26	1991-09-13	1991-10-14	Yes
Israel	1986-09-26	1989-05-25	1989-06-25	Yes
Italy	1986-09-26	1990-02-08	1990-03-11	Yes
Jamaica				Yes/U[d]
Japan	1987-03-06	1987-06-09	1987-07-10	Yes
Jordan	1986-10-02	1987-12-11	1988-01-11	Yes
Kazakhstan				Yes

CONVENTION ON EARLY NOTIFICATION OF A NUCLEAR ACCIDENT (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Kenya				Yes
Korea, Republic of		1990-06-08	1990-07-09	Yes
Kuwait				Yes
Kyrgyzstan[b]				Yes
Latvia		1992-12-28	1993-01-28	Yes
Lebanon	1986-09-26	1997-04-17	1997-05-17	Yes/U[d]
Libyan Arab Jamahiriya				Yes/U[d]
Liechtenstein	1986-09-26	1994-04-19	1994-05-20	Yes
Lithuania		1994-11-16	1994-12-17	Yes
Luxembourg	1986-09-29			Yes
Madagascar				Yes/U[d]
Malawi[b]				Yes
Malaysia	1987-09-01	1987-09-01	1987-10-02	Yes
Maldives[b]				Yes
Mali	1986-10-02			Yes/U[d]
Malta				Yes
Mauritius		1992-08-17	1992-09-17	Yes
Mexico	1986-09-26	1988-05-10	1988-06-10	Yes
Monaco	1986-09-26	1989-07-19	1989-08-19	Yes
Mongolia	1987-01-08	1987-06-11	1987-07-12	Yes
Morocco	1986-09-26	1993-10-07	1993-11-07	Yes
Mozambique[b]				Yes/U[d]
Myanmar		1997-12-18	1998-01-18	Yes
Namibia				Yes/U[d]
Nepal[b]				Yes/U[d]
Netherlands	1986-09-26	1991-09-23	1991-10-24	Yes
New Zealand		1987-03-11	1987-04-11	Yes
Nicaragua		1993-11-11	1993-12-12	Yes
Niger	1986-09-26			Yes
Nigeria	1987-01-21	1990-08-10	1990-09-10	Yes
Norway	1986-09-26	1986-09-26	1986-10-27	Yes
Pakistan		1989-09-11	1989-10-12	Yes

CONVENTION ON EARLY NOTIFICATION OF A NUCLEAR ACCIDENT (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Panama	1986-09-26			Yes/U[d]
Papua New Guinea[b]				Yes
Paraguay	1986-10-02			Yes
Peru		1995-07-17	1995-08-17	Yes
Philippines		1997-05-05	1997-06-05	Yes
Poland	1986-09-26	1988-03-24	1988-04-24	Yes
Portugal	1986-09-26	1993-04-30	1993-05-31	Yes
Qatar				Yes
Republic of Moldova		1998-05-07	1998-06-07	Yes
Romania		1990-06-12	1990-07-13	Yes
Russian Federation	1986-09-26	1986-12-23	1987-01-24	Yes
Saint Lucia[b]				Yes
Samoa[b]				Yes
Saudi Arabia		1989-11-03	1989-12-04	Yes
Senegal	1987-06-15			Yes
Sierra Leone	1987-03-25			No
Singapore		1997-12-15	1998-01-15	Yes
Slovakia		1993-02-10	1993-01-01[c]	Yes
Slovenia		1992-07-07	1991-06-25[c]	Yes
South Africa	1987-08-10	1987-08-10	1987-09-10	Yes
Spain	1986-09-26	1989-09-13	1989-10-14	Yes
Sri Lanka		1991-01-11	1991-02-11	Yes/U[d]
Sudan	1986-09-26			Yes
Sweden	1986-09-26	1987-02-27	1987-03-30	Yes
Switzerland	1986-09-26	1988-05-31	1988-07-01	Yes
Syrian Arab Republic	1987-07-02			Yes
Thailand	1987-09-25	1989-03-21	1989-04-21	Yes
The Former Yugoslav Republic of Macedonia		1996-09-20	1991-11-17[c]	Yes/U[d]
Tunisia	1987-02-24	1989-02-24	1989-03-27	Yes
Turkey	1986-09-26	1991-01-03	1991-02-03	Yes
Turkmenistan[b]				Yes

CONVENTION ON EARLY NOTIFICATION OF A NUCLEAR ACCIDENT (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Uganda				Yes/U[d]
Ukraine	1986-09-26	1987-01-26	1987-02-26	Yes
United Arab Emirates		1987-10-02	1987-11-02	Yes/U[d]
United Kingdom	1986-09-26	1990-02-09	1990-03-12	Yes
United Republic of Tanzania				Yes
United States of America	1986-09-26	1988-09-19	1988-10-20	Yes
Uruguay		1989-12-21	1990-01-21	Yes
Uzbekistan				Yes/U[d]
Venezuela				Yes/U[d]
Viet Nam		1987-09-29	1987-10-30	Yes
Yemen				Yes
Yugoslavia	1987-05-27	1989-02-08	1989-03-11	Yes
Zambia				Yes
Zimbabwe	1986-09-26			Yes/U[d]
Food and Agriculture Organization		1990-10-19	1990-11-19	Yes
World Health Organization		1988-08-10	1988-09-10	Yes
World Meteorological Organization		1990-04-17	1990-05-18	Yes
International Labour Organization				Yes
UN Educational, Scientific and Cultural Organization				Yes
UN Environment Programme				Yes
UN Office for the Coordination of Humanitarian Affairs				Yes
Arab Atomic Energy Agency				Yes
European Commission				Yes

[a] Instrument of ratification, accession, acceptance, etc.

[b] Not a Member State of the IAEA.

[c] Effective date of entry into force.

[d] Notification is unofficial, or is not specific to this Convention.

Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (INFCIRC/336)

7. An IAEA-organized mission visited Bangladesh in October 1997 in response to a request for assistance concerning a number of well logging radioactive sources possibly lost or damaged following an explosion and fire at a gas extraction well. The mission found that the sources had been located and were in a safe condition. In response to a request from Georgia in October 1997, the Agency co-ordinated assistance in finding and securing a number of radiation sources discovered at a military base, and in treating a number of servicemen who had developed radiation induced skin injuries. Further information on these two incidents is given in the Nuclear Safety Review for the Year 1997 (GC(42)/INF/6). The Agency is presently seeking further information in relation to requests for assistance from Namibia (to find and make safe a number of well logging sources) and from Bosnia and Herzegovina (concerning possible cobalt-60 sources without physical protection).

8. As of 30 June 1998, there were 77 parties to the Convention (74 States and 3 organizations), two States — the Republic of Moldova and Singapore — having acceded since the last session of the General Conference and one — Bosnia and Herzegovina — having succeeded to the Convention. The parties are listed in the following table, which also shows the other signatories to the Convention, and other non-parties that have made know to the IAEA Secretariat their contact points for the purposes of the Convention.

CONVENTION ON ASSISTANCE IN THE CASE OF A NUCLEAR ACCIDENT OR RADIOLOGICAL EMERGENCY (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Afghanistan	1986-09-26			No
Albania				Yes/U[d]
Algeria	1987-09-24			Yes
Andorra[b]				Yes/U[d]
Argentina		1990-01-17	1990-02-17	Yes
Armenia		1993-08-24	1993-09-24	Yes
Australia	1986-09-26	1987-09-22	1987-10-23	Yes
Austria	1986-09-26	1989-11-21	1989-12-22	Yes
Azerbaijan[b]				Yes/U[d]

CONVENTION ON ASSISTANCE IN THE CASE OF A NUCLEAR ACCIDENT OR RADIOLOGICAL EMERGENCY (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Bangladesh		1988-01-07	1988-02-07	Yes
Belarus	1986-09-26	1987-01-26	1987-02-26	Yes
Belgium	1986-09-26			Yes
Bolivia				Yes
Bosnia and Herzegovina		1998-06-30	1992-03-01[c]	Yes
Brazil	1986-09-26	1990-12-04	1991-01-04	Yes
Brunei Darussalam[b]				Yes
Bulgaria	1986-09-26	1988-02-24	1988-03-26	Yes
Cameroon	1987-09-25			No
Canada	1986-09-26			Yes
Chile	1986-09-26			No
China	1986-09-26	1987-09-10	1987-10-11	Yes
Colombia				Yes
Costa Rica	1986-09-26	1991-09-16	1991-10-17	Yes
Côte d'Ivoire	1986-09-26			No
Croatia		1992-09-29	1991-10-08[c]	Yes
Cuba	1986-09-26	1991-01-08	1991-02-08	Yes
Cyprus		1989-01-04	1989-02-04	No
Czech Republic		1993-03-24	1993-01-01[c]	Yes
DPR Korea[b]	1986-09-29			Yes
Democratic Republic of the Congo	1986-09-30			Yes/U[d]
Denmark	1986-09-26			Yes
Dominica[b]				Yes
Dominican Republic				Yes/U[d]
Ecuador				Yes
Egypt	1986-09-26	1988-10-17	1988-11-17	Yes
Estonia		1994-05-09	1994-06-09	No
Ethiopia				Yes
Finland	1986-09-26	1990-11-27	1990-12-28	Yes
France	1986-09-26	1989-03-06	1989-04-06	Yes
Georgia				Yes/U[d]

CONVENTION ON ASSISTANCE IN THE CASE OF A NUCLEAR ACCIDENT OR RADIOLOGICAL EMERGENCY (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Germany	1986-09-26	1989-09-14	1989-10-15	Yes
Ghana				Yes
Greece	1986-09-26	1991-06-06	1991-07-07	Yes
Guatemala	1986-09-26	1988-08-08	1988-09-08	No
Guinea[b]				Yes/U[d]
Haiti				Yes/U[d]
Holy See	1986-09-26			No
Hungary	1986-09-26	1987-03-10	1987-04-10	Yes
Iceland	1986-09-26			No
India	1986-09-29	1988-01-28	1988-02-28	Yes
Indonesia	1986-09-26	1993-11-12	1993-12-13	Yes
Iran, Islamic Republic of	1986-09-26			No
Iraq	1987-08-12	1988-07-21	1988-08-21	No
Ireland	1986-09-26	1991-09-13	1991-10-14	Yes
Israel	1986-09-26	1989-05-25	1989-06-25	Yes
Italy	1986-09-26	1990-10-25	1990-11-25	Yes
Jamaica				Yes/U[d]
Japan	1987-03-06	1987-06-09	1987-07-10	Yes
Jordan	1986-10-02	1987-12-11	1988-01-11	Yes
Kazakhstan				Yes
Kenya				Yes
Korea, Republic of		1990-06-08	1990-07-09	Yes
Kyrgyzstan[b]				Yes
Latvia		1992-12-28	1993-01-28	Yes
Lebanon	1986-09-26	1997-04-17	1997-05-17	Yes/U[d]
Libyan Arab Jamahiriya		1990-06-27	1990-07-28	Yes/U[d]
Liechtenstein	1986-09-26	1994-04-19	1994-05-20	No
Lithuania				Yes
Madagascar				Yes/U[d]
Malawi[b]				Yes
Malaysia	1987-09-01	1987-09-01	1987-10-02	Yes

CONVENTION ON ASSISTANCE IN THE CASE OF A NUCLEAR ACCIDENT OR RADIOLOGICAL EMERGENCY (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Mali	1986-10-02			Yes/U[d]
Malta				Yes
Mauritius		1992-08-17	1992-09-17	Yes
Mexico	1986-09-26	1988-05-10	1988-06-10	Yes
Monaco	1986-09-26	1989-07-19	1989-08-19	Yes
Mongolia	1987-01-08	1987-06-11	1987-07-12	No
Morocco	1986-09-26	1993-10-07	1993-11-07	Yes/U[d]
Mozambique[b]				Yes/U[d]
Myanmar				Yes
Namibia				Yes/U[d]
Nepal[b]				Yes/U[d]
Netherlands	1986-09-26	1991-09-23	1991-10-24	Yes
New Zealand		1987-03-11	1987-04-11	Yes
Nicaragua		1993-11-11	1993-12-12	Yes
Niger	1986-09-26			No
Nigeria	1987-01-21	1990-08-10	1990-09-10	No
Norway	1986-09-26	1986-09-26	1987-02-26	Yes
Pakistan		1989-09-11	1989-10-12	Yes
Panama	1986-09-26			Yes/U[d]
Papua New Guinea[b]				Yes
Paraguay	1986-10-02			Yes
Peru		1995-07-17	1995-08-17	Yes
Philippines		1997-05-05	1997-06-05	Yes
Poland	1986-09-26	1988-03-24	1988-04-24	Yes
Portugal	1986-09-26			Yes
Republic of Moldova		1998-05-07	1998-06-07	Yes/U[d]
Romania		1990-06-12	1990-07-13	Yes
Russian Federation	1986-09-26	1986-12-23	1987-02-26	Yes
Samoa[b]				Yes
Saudi Arabia		1989-11-03	1989-12-04	Yes
Senegal	1987-06-15			No

CONVENTION ON ASSISTANCE IN THE CASE OF A NUCLEAR ACCIDENT OR RADIOLOGICAL EMERGENCY (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
Sierra Leone	1987-03-25			No
Singapore		1997-12-15	1998-01-15	Yes
Slovakia		1993-02-10	1993-01-01[c]	Yes
Slovenia		1992-07-07	1991-06-25[c]	Yes
South Africa	1987-08-10	1987-08-10	1987-09-10	Yes
Spain	1986-09-26	1989-09-13	1989-10-14	Yes
Sri Lanka		1991-01-11	1991-02-11	Yes
Sudan	1986-09-26			Yes
Sweden	1986-09-26	1992-06-24	1992-07-25	Yes
Switzerland	1986-09-26	1988-05-31	1988-07-01	Yes
Syrian Arab Republic	1987-07-02			Yes
Thailand	1987-09-25	1989-03-21	1989-04-21	No
The Former Yugoslav Republic of Macedonia		1996-09-20	1991-11-17[c]	Yes/U[d]
Tunisia	1987-02-24	1989-02-24	1989-03-27	No
Turkey	1986-09-26	1991-01-03	1991-02-03	Yes
Uganda				Yes/U[d]
Ukraine	1986-09-26	1987-01-26	1987-02-26	Yes
United Arab Emirates		1987-10-02	1987-11-02	Yes
United Kingdom	1986-09-26	1990-02-09	1990-03-12	Yes
United Republic of Tanzania				Yes
United States of America	1986-09-26	1988-09-19	1988-10-20	Yes
Uruguay		1989-12-21	1990-01-21	Yes
Venezuela				Yes/U[d]
Viet Nam		1987-09-29	1987-10-30	Yes
Yemen				Yes
Yugoslavia		1991-04-09	1991-05-10	No
Zambia				Yes
Zimbabwe	1986-09-26			Yes/U[d]
Food and Agriculture Organization		1990-10-19	1990-11-19	Yes
World Health Organization		1988-08-10	1988-09-10	Yes
World Meteorological Organization		1990-04-17	1990-05-18	No

CONVENTION ON ASSISTANCE IN THE CASE OF A NUCLEAR ACCIDENT OR RADIOLOGICAL EMERGENCY (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force	Contact point made known to IAEA
International Labour Organization				Yes
UN Educational, Scientific and Cultural Organization				Yes
UN Environment Programme				Yes
UN Office for the Coordination of Humanitarian Affairs				Yes
Arab Atomic Energy Agency				Yes
European Commission				Yes

[a] Instrument of ratification, accession, acceptance, etc.

[b] Not a Member State of the IAEA.

[c] Effective date for entry into force.

[d] Notification is unofficial, or is not specific to this Convention.

Convention on Nuclear Safety (INFCIRC/449)

9. The first Review Meeting — to review the national reports by each of the Contracting Parties on the measures they have undertaken to implement their obligations under the Convention — is scheduled to begin on 12 April 1999. An Organizational Meeting will be held in Vienna from 29 September to 2 October 1998 to prepare for the Review Meeting, in particular to allocate Contracting Parties to Country Groups for the Review Meeting, using an agreed process, and to select co-ordinators and elect rapporteurs for each of these Groups. At the Review Meeting, each Country Group will discuss in detail the national reports from the members of that Group (members of other Groups will also have the opportunity to comment), and then report findings to the plenary session. The starting date for the Organizational Meeting, 29 September 1998, is also the deadline for States that are already Contracting Parties to submit their national reports.

10. Since the last session of the General Conference, six States — Italy, Pakistan, Portugal, the Republic of Moldova, Singapore and Ukraine — have ratified or acceded to the Convention (a further two States which had ratified the Convention less than 90 days before the last session of the General Conference — Austria and Peru — have also duly become

contracting parties). A total of 46 States (27 of which have at least one "nuclear installation", as defined in the Convention, that has achieved criticality in a reactor core) had deposited instruments of ratification or accession by 1 July 1998, and will therefore be Contracting Parties by 29 September 1998, the first day of the Organizational Meeting. Of the 22 further States that have signed the Convention but are not contracting parties, four — Armenia, India, Kazakhstan and the USA — have at least one nuclear installation that has achieved criticality in a reactor core.

CONVENTION ON NUCLEAR SAFETY (as of 1998-06-30)

State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force
Algeria	1994-09-20		
Argentina[e]	1994-10-20	1997-04-17	1997-07-16
Armenia[e]	1994-09-22		
Australia	1994-09-20	1996-12-24	1997-03-24
Austria	1994-09-20	1997-08-26	1997-11-24
Bangladesh	1995-09-21	1995-09-21	1996-10-24
Belgium[e]	1994-09-20	1997-01-13	1997-04-13
Brazil[e]	1994-09-20	1997-03-04	1997-06-02
Bulgaria[e]	1994-09-20	1995-11-08	1996-10-24
Canada[e]	1994-09-20	1995-12-12	1996-10-24
Chile	1994-09-20	1996-12-20	1997-03-20
China[e]	1994-09-20	1996-04-09	1996-10-24
Croatia	1995-04-10	1996-04-18	1996-10-24
Cuba	1994-09-20		
Czech Republic[e]	1994-09-20	1995-09-18	1996-10-24
Denmark	1994-09-20		
Egypt	1994-09-20		
Finland[e]	1994-09-20	1996-01-22	1996-10-24
France[e]	1994-09-20	1995-09-13	1996-10-24
Germany[e]	1994-10-05	1997-01-20	1997-04-20
Ghana	1995-07-06		
Greece	1994-11-01	1997-06-20	1997-09-18
Hungary[e]	1994-09-20	1996-03-18	1996-10-24
Iceland	1995-09-21		
India[e]	1994-09-20		

CONVENTION ON NUCLEAR SAFETY (as of 1998-06-30)			
State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force
Indonesia	1994-09-20		
Ireland	1994-09-20	1996-07-11	1996-10-24
Israel	1994-09-22		
Italy	1994-09-27	1998-04-15	1998-07-14
Japan[c]	1994-09-20	1995-05-12	1996-10-24
Jordan	1994-12-06		
Kazakhstan[c]	1996-09-20		
Korea, Republic of[c]	1994-09-20	1995-09-19	1996-10-24
Latvia		1996-10-25	1997-01-23
Lebanon	1995-03-07	1996-06-05	1996-10-24
Lithuania[c]	1995-03-22	1996-06-12	1996-10-24
Luxembourg	1994-09-20	1997-04-07	1997-07-06
Mali	1995-05-22	1996-05-13	1996-10-24
Mexico[c]	1994-11-09	1996-07-26	1996-10-24
Monaco	1994-09-16		
Morocco	1994-12-01		
Netherlands[c]	1994-09-20	1996-10-15	1997-01-13
Nicaragua	1994-09-23		
Nigeria	1994-09-21		
Norway	1994-09-21	1994-09-29	1996-10-24
Pakistan	1994-09-20	1997-09-30	1997-12-29
Peru	1994-09-22	1997-07-01	1997-09-29
Philippines	1994-10-14		
Poland	1994-09-20	1995-06-14	1996-10-24
Portugal	1994-10-03	1998-05-20	1998-08-18
Republic of Moldova		1998-05-07	1998-08-05
Romania[c]	1994-09-20	1995-06-01	1996-10-24
Russian Federation[c]	1994-09-20	1996-07-12	1996-10-24
Singapore		1997-12-15	1998-03-15
Slovakia[c]	1994-09-20	1995-03-07	1996-10-24
Slovenia[c]	1994-09-20	1996-11-20	1997-02-18
South Africa[c]	1994-09-20	1996-12-24	1997-03-24
Spain[c]	1994-11-15	1995-07-04	1996-10-24

CONVENTION ON NUCLEAR SAFETY (as of 1998-06-30)			
State/Organization	Signature	Deposit of expression of consent to be bound[a]	Entry into force
Sudan	1994-09-20		
Sweden[c]	1994-09-20	1995-09-11	1996-10-24
Switzerland[c]	1995-10-31	1996-09-12	1996-09-11
Syrian Arab Republic	1994-09-23		
Tunisia	1994-09-20		
Turkey	1994-09-20	1995-03-08	1996-10-24
Ukraine[c]	1994-09-20	1998-04-08	1998-07-07
United Kingdom[c]	1994-09-20	1996-01-17	1996-10-24
United States of America[c]	1994-09-20		
Uruguay	1996-02-28		

[a] Instrument of ratification, accession, acceptance, etc.

[c] States having at least one "nuclear installation" (as defined in the Convention) that has achieved criticality in a reactor core.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

11. After seven meetings of a group of legal and technical experts starting in 1995, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was adopted at a Diplomatic Conference in Vienna, 1–5 September 1997. The Joint Convention was opened for signature on 29 September 1997, at the 41st IAEA General Conference. General Conference Resolution GC(41)/RES/11 appealed to all States to sign and subsequently ratify, accept or approve the Convention, so that it may enter into force as soon as possible.

12. The Joint Convention is the first legal instrument to address directly the issues of safety in the context of spent nuclear fuel and radioactive wastes on a global scale. It applies to spent fuel and radioactive wastes resulting from civilian nuclear reactors and applications, and to spent fuel and radioactive waste from military or defence programmes if and when such materials are transferred permanently to and managed within exclusively civilian programmes, or when declared as spent fuel or radioactive waste for the purpose of the Joint Convention by the Contracting Party. Spent fuel held at a reprocessing facility as part of

reprocessing activities is covered by the Joint Convention only if the Contracting Parties declares it to be so. The Joint Convention also applies to planned and controlled releases into the environment of liquid or gaseous radioactive materials from regulated nuclear facilities.

13. The Joint Convention imposes obligations on Contracting Parties related to ensuring the safety of spent fuel and radioactive wastes largely based on the principles contained in the IAEA Safety Fundamentals document "The Principles of Radioactive Waste Management" which was published in 1995. It also contains requirements related to the transboundary movement of spent fuel and radioactive waste (based on the 1990 IAEA Code of Practice on the International Transboundary Movement of Radioactive Waste), and to the safe management of disused sealed sources.

14. As of 30 June 1998, 34 States had signed the Convention (21 of which have at least one operating nuclear power plant), and three — Canada, Hungary and Norway — had ratified it. The Joint Convention will enter into force after 25 States, at least 15 of which have operating nuclear power plants, have ratified it.

JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT (as of 1998-06-30)

State	Signature	Deposit of expression of consent to be bound[a]
Argentina[e]	1997-12-19	
Belgium[e]	1997-12-08	
Brazil[e]	1997-10-31	
Canada[e]	1998-05-07	1998-05-07
Croatia	1998-04-09	
Czech Republic[e]	1997-09-30	
Denmark	1998-02-09	
Finland[e]	1997-10-02	
France[e]	1997-09-29	
Germany[e]	1997-10-01	
Greece	1998-02-09	
Hungary[e]	1997-09-29	1998-06-02
Indonesia	1997-10-06	
Ireland	1997-10-01	
Italy	1998-01-26	
Kazakhstan[e]	1997-09-29	

JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT (as of 1998-06-30)

State	Signature	Deposit of expression of consent to be bound[a]
Korea, Republic of[c]	1997-09-29	
Lebanon	1997-09-30	
Lithuania[c]	1997-09-30	
Luxembourg	1997-10-01	
Morocco	1997-09-29	
Norway	1997-09-29	1998-01-12
Peru	1998-06-04	
Philippines	1998-03-10	
Poland	1997-10-03	
Romania[c]	1997-09-30	
Slovakia[c]	1997-09-30	
Slovenia[c]	1997-09-29	
Spain[c]	1998-06-30	
Sweden[c]	1997-09-29	
Switzerland[c]	1997-09-29	
Ukraine[c]	1997-09-29	
United Kingdom[c]	1997-09-29	
United States of America[c]	1997-09-29	

[a] Instrument of ratification, accession, acceptance, etc.

[c] States having at least one operating nuclear power plant.

PART B

ESTABLISHMENT OF INTERNATIONAL SAFETY STANDARDS

Background

1. Under Article III.A.6 of its Statute, the Agency is authorized to establish or adopt standards of safety in collaboration with the competent organs of the United Nations and with the specialized agencies concerned. Since soon after the Agency's inception the Secretariat has been involved in developing and setting such standards.

2. In 1996, the Secretariat introduced a uniform preparation and review process for safety standards. To this end, it created a set of advisory bodies with harmonized terms of reference to assist it in preparing and reviewing all documents, namely the *Advisory Commission for Safety Standards* (ACSS), the *Nuclear Safety Standards Advisory Committee* (NUSSAC), the *Radiation Safety Standards Advisory Committee* (RASSAC), the *Waste Safety Standards Advisory Committee* (WASSAC) and the *Transport Safety Standards Advisory Committee* (TRANSSAC). It assigned to each of these bodies a Scientific Secretary, who co-ordinates the work of the body with the relevant Agency policies and programmes, and appoints a Technical Officer for the preparation of each document in accordance with recommendations made.

International basis for the Agency's safety standards

3. The Agency establishes its safety standards on the basis of advice provided by its International Nuclear Safety Advisory Group (INSAG), of studies by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and of recommendations made by a number of international bodies, principally the International Commission on Radiological Protection (ICRP).[1]

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[1] In *The Agency's Health and Safety Measures*, INFCIRC/18, it was stated that "The Agency's basic safety standards ... will be based, to the extent possible, on the recommendations of the International Commission on Radiological Protection (ICRP)".

4. INSAG — an independent advisory group to the Director General of the IAEA — is currently working on four main reports. A 'high level document' (as yet untitled) addressing the fundamental objectives and principles of nuclear, radiation and waste safety, and an updated version of an earlier report (INSAG-3) on basic safety principles for nuclear power plants are both at an advanced stage, and reports on the safe management of ageing of nuclear power plants and on safety management are both in the development stage.

5. UNSCEAR's work can be divided into that relating to the levels of radiation exposure and that relating to the biological and health effects of radiation exposure. Major areas of current interest in the former category include estimating worldwide exposures from natural sources, global doses and trends in medical exposure, exposure of the local population from the Chernobyl accident, doses from natural sources in workplaces and the total doses received by people who are occupationally exposed. In the biological area, UNSCEAR's current interests include the effects of radiation on children and on the developing brain in utero, the mechanisms involved in oncogenesis and hereditary effects, dose and dose rate effects, the adaptive response (on which UNSCEAR published a report in 1994), epidemiology (particularly the Life Span Study of survivors of the atomic bombing of Hiroshima and Nagasaki), and interactions between the effects of radiation and other carcinogens.

6. The ICRP's Main Commission and four Committees underwent a change of membership in 1997, and held their first meetings of the 1997–2001 term in September 1997. Recommendations approved by the previous Commission have recently been issued on the radiation protection of workers, protection from potential exposures and radiological protection policy for the disposal of radioactive waste. Work is in progress in many areas through the four Committees:

- Committee 1 established two Task Groups, to look at radiation-induced cancer risks at low doses and radiation effects on the embryo and foetus;
- Committee 2 has Task Groups addressing, inter alia, doses to embryos and foetuses from intakes of radionuclides by the mother, internal dosimetry and dose calculations and the specification of Reference Man;
- Committee 3 has three new Task Groups, on avoidance of radiation injuries in interventional (medical) procedures, on accident prevention and safety in radiation therapy and on pregnancy and medical radiation

- Committee 4 has Task Groups on the disposal of long-lived solid radioactive waste and on protection of the public in chronic exposure situations.

The hierarchy of Agency safety standards documents

7. In 1989, following a major expansion of the Agency's safety related activities, the Secretariat introduced a hierarchical structure for IAEA Safety Series publications, which were divided into Safety Fundamentals, Safety Standards, Safety Guides and Safety Practices. In order to clarify the status of the different documents, this structure was modified in 1996, the single Safety Series being replaced by:

- the **Safety Standards Series**, comprising those documents issued by the Agency pursuant to Article III.A.6 of its Statute; and
- the **Safety Reports Series**, to contain more descriptive documents of the type previously issued as Safety Practices, which are issued by the Agency for the purpose of safety related information exchange.

8. The Safety Standards Series documents fall into three categories:

- **Safety Fundamentals**, which state the basic objectives, concepts and principles involved in ensuring protection and safety;
- **Safety Requirements**, which specify requirements that must be satisfied in order to ensure safety for particular activities or application areas, these requirements being governed by the basic objectives, concepts and principles stated in Safety Fundamentals; and
- **Safety Guides,** which supplement Safety Requirements by presenting recommendations, based on international experience, regarding measures to ensure the observance of safety requirements..

9. **Safety Reports** give examples and descriptions of methods which can be applied in implementing both Safety Requirements and Safety Guides. They are not regulatory documents but rather documents for fostering information exchange — hence the Secretariat's decision to separate them from the Agency's Safety Standards Series.

Activities of the advisory bodies

Advisory Commission for Safety Standards (ACSS)

10. The Advisory Commission for Safety Standards (ACSS) is a standing body of senior government officials holding national responsibilities for establishing standards and other regulatory documents relevant to nuclear, radiation, waste and transport safety. The ACSS has a special overview role with regard to the Agency's safety standards and provides advice to the Director General on the overall safety-standards-related programme.

11. The ACSS, chaired by Dr. A. Bishop of the Atomic Energy Control Board, Canada, began at its June 1998 meeting its work of reviewing and endorsing safety standards forwarded to the Commission by the Advisory Committees. The Commission endorsed the submission of Safety Requirements on near surface disposal of radioactive waste to the Board of Governors for approval. The ACSS also endorsed the publication of eight Safety Guides: one on safety assessment for near surface disposal, three on occupational radiation protection and four on the safety of research reactors.

12. The Commission also considered a number of questions concerning documents proposed or in preparation, including a new structure for the suite of General Safety Guides on governmental organization. It was proposed by the Secretariat that more useful guidance could be given if two separate sets of Safety Guides were prepared, one set for nuclear facilities (essentially reactors, fuel cycle facilities and repositories) and another set for other uses of radiation and radioactive materials in medicine, industry and research. The ACSS expressed no objections to this new approach, and detailed specifications will now be developed for each of the Safety Guides needed, with NUSSAC taking the lead for nuclear facilities and RASSAC leading on the other uses.

**Nuclear Safety Standards Advisory Committee (NUSSAC),
Radiation Safety Standards Advisory Committee (RASSAC),
Waste Safety Standards Advisory Committee (WASSAC) and
Transport Safety Standards Advisory Committee (TRANSSAC)**

13. Each of the four Advisory Committees is a standing body of senior regulatory officials with technical expertise in the relevant area of safety. They provide advice to the Secretariat on the overall safety programme in their respective areas of expertise, and have the primary role in the development and revision of the Agency's safety standards in that area.

14. **NUSSAC**, under the chairmanship of Mr. P. Govaerts of AIB-Vinçotte Nucléaire, Belgium, met twice during the year, and has provided advice on the revision and updating of the existing NUSS documents in the areas of nuclear power plant operation, design and siting and on research reactors. In addition, as the nominated lead Committee for the revision of the governmental organization standards, NUSSAC has considered the topics which must be covered in the series of safety guides..

15. The aim is to have a completely revised set of documents by the year 2000 and the programme is now at the stage where a large number of documents are under preparation and review at any time. A small number of documents are approaching the end of this process, most notably the three Safety Requirements documents on operation, design, and legal and governmental infrastructure. These Safety Requirements, which will replace the existing Codes, are important for identifying assistance needs and updating the safety review services such as OSART and IRRT (see Annex C-6). The revision has also been given added impetus by the entry into force of the Convention on Nuclear Safety. It seems likely that Agency standards may be used in the contracting party discussions.

16. **RASSAC**, under the chairmanship of Mr. S.L. Creswell of the Nuclear Installations Inspectorate, United Kingdom, met in March 1998 and were due to meet again in early September 1998.

17. A priority for RASSAC is to complete the development of guidance for implementing the requirements of the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources. At its March meeting, the Committee approved final drafts of three Safety Guides dealing with occupational radiation safety; these have since been endorsed by the ACSS and will now proceed to publication. A Safety Guide on preventing, detecting and responding to illicit trafficking in radioactive materials has been approved for circulation to Member States for comment, as has another dealing with the safety of radiation sources. The comments will now be taken into account, and the drafts should then be finalized in the second half of 1998. RASSAC continues to review the progress of ten more draft documents at various stages of development; at least two are expected to go to Member States for comment in 1998. The Committee also gave its approval for the development of a Safety Requirements document on emergency preparedness and response.

18. RASSAC has continued to provide advice to the secretariat on matters where radiation safety guidance is under development, for example in relation to application of the principles of exclusion of exposure and exemption and clearance from regulatory control. Similar review and evaluation is anticipated in the next year in connection with preparing safety guidance on chronic exposure (existing exposure which may require intervention to reduce it) and on potential exposure (exposure that is not certain to occur and to which probabilistic methods may be applied).

19. At the final meeting of the present Committee (September 1998), it is expected that RASSAC will conduct a full review of progress over its three years of office on the Agency's overall programme for development of radiation safety standards.

20. **WASSAC**, chaired by Mr. P. Metcalf of the Council for Nuclear Safety, South Africa, has met twice since the last session of the General Conference, in December 1997 and June 1998. The December meeting approved submission to the ACSS of the two documents on near surface disposal mentioned in the ACSS section above. At the June meeting, two Safety Guides on decommissioning were approved for transmission to the ACSS; the Safety Requirements for pre-disposal management of radioactive waste were also approved for transmission to the ACSS subject to certain revisions to be approved by correspondence. A Safety Guide on assessment for pre-disposal management was approved, subject to some revisions, for circulation to Member States.

21. WASSAC agreed, with some modification, proposals for a set of safety standards on rehabilitation of areas affected by residual wastes. Safety Requirements will be supported by two Safety Guides in the RADWASS programme, on criteria for rehabilitation and on application of the criteria, and a Safety Guide in the radiation safety standards programme on chronic exposure situations. There were also extensive discussions on how to proceed with safety standards in the areas of discharges (in which RASSAC also has an interest) and geologic disposal. On discharges, RASSAC had taken the view that the Basic Safety Standards provided Safety Requirements to cover the aspects concerning the protection of human health, so discussions focused on whether Safety Requirements were needed for protection of the environment and non-human species. On geologic disposal, WASSAC's feeling was that there was not yet sufficient consensus to form the basis of safety standards, but that current developments in forums such as the ICRP and the IAEA's Principles and Criteria Subgroup might help to clarify the issues. The safety aspects of the removal of

regulatory controls from nuclear facilities and use of materials has been the subject of discussion at several WASSAC meetings. It is presently planned to issue new guidance on the safety principles for removing controls as part of a Safety Guide being prepared in the RASS programme and on the management of the process in a Safety Guide within the RADWASS programme.

22. **TRANSSAC**, under the chairmanship of Mr. W. Collin of the Bundesamt für Strahlenschutz (Federal Office for Radiation Protection), Germany, met in May 1998. The Committee agreed that, subject to the Chairman approving some final revisions, the Safety Guides "Advisory Material for the Regulations for the Safe Transport of Radioactive Materials" and "Planning and Preparing for Emergency Response to Transport Accidents involving Radioactive Material" should be transmitted to the ACSS. The Committee also agreed material produced by a Consultants Meeting which developed a simplified model of the IAEA Transport Regulations. This material will be made available to Member States, and training material to support the package will be developed.

23. TRANSSAC also considered the proposals from a Technical Committee Meeting on the Comprehensive Review of the Transport Regulatory Approach. The Committee endorsed the proposal of a two-year revision process, but recommended that the more specific proposals on the revision process itself be refined. A Technical Committee Meeting is scheduled for October 1998, and TRANSSAC recommended that a Consultants Meeting (CSM) be held before the TCM to prepare specific proposals for refining the revision process. The Committee further recommended that the CSM and TCM consider proposals concerning quality in the revision process.

Membership of the advisory bodies

24. The Director General appointed the advisory committee members for a three-year term, which expires at the end of 1998. The Secretariat is inviting Member States to nominate persons for membership of the advisory committees for the term 1999–2001. Proposed candidates for membership of these committees are expected to represent the views of their national regulatory body. They must be senior experts in the relevant fields, and be in a position to participate actively and regularly in the committees' activities: typically two meetings a year. Furthermore, the Agency normally expects Member States to meet the costs of participation in the committees of the representatives of their regulatory bodies as contributions in kind.

25. The members of the ACSS are appointed for a four-year term. The present term expires at the end of 1999.

STATUS OF SAFETY STANDARDS — GENERAL SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
Safety Fundamentals			
110: The Safety of Nuclear Installations (1993) 111-F: The Principles of Radioactive Waste Management (1993) 120: Radiation Protection and the Safety of Radiation Sources (1996)		The three Safety Fundamentals to be combined into one document. No plans for revision prior to the year 2001.	
Emergency Preparedness And Response			
	NS43: Int. Requirements for Nuclear and Radiation Emergency Preparedness and Response	Safety Requirement. DPP reviewed by RASSAC-4, March 1998.	RASSAC, NUSSAC, WASSAC, TRANSSAC
50-SG-G6: Preparedness of Public Authorities for Emergencies at Nuclear Power Plants (1982)		Revision to start in 1999, after a decision by ACSS	RASSAC, NUSSAC, WASSAC, TRANSSAC
50-SG-O6: Preparedness of the Operating Organization (Licensee) for Emergencies at NPPs (1982)		Revision to start in 1999, after a decision by ACSS	RASSAC, NUSSAC, WASSAC, TRANSSAC
109: Intervention Criteria in a Nuclear or Radiation Emergency (1994)		No revision is foreseen prior to the year 2001.	
98: On-Site Habitability in the Event of an Accident at a Nuclear Facility (1989)		Revision to start in 1999, after a decision by ACSS	RASSAC, NUSSAC, WASSAC, TRANSSAC
Governmental Organization			
50-C-G (Rev. 1): Code on the Safety of Nuclear Power Plants: Governmental Organization (1988)	NS180: Requirements: Legal & governmental infrastructure for nuclear, radiation, radioactive waste and transport safety	Draft resulting from MS comments sent to the ACs for final review.	NUSSAC, RASSAC, WASSAC, TRANSSAC
50-SG-G1: Qualifications and Training of Staff of the Regulatory Body for Nuclear Power Plants (1979)	NS247: Organization and staffing of the regulatory body for nuclear facilities and activities	Drafted in Nov.1997 to be sent to all committees for review in 1998.	NUSSAC, RASSAC, WASSAC, TRANSSAC
50-SG-G2: Information to be Submitted in Support of Licensing Applications for Nuclear Power Plants (1979)		Revision to start in 1998.	NUSSAC, RASSAC, WASSAC, TRANSSAC

STATUS OF SAFETY STANDARDS — GENERAL SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
50-SG-G3: Conduct of Regulatory Review and Assessment during the Licensing Process for Nuclear Power Plants (1979)	**NS248: Conduct of regulatory review and assessment of nuclear facilities and activities**	**CS held Dec. 1997, additional CS in 1998.**	**NUSSAC, RASSAC, WASSAC, TRANSSAC**
50-SG-G4 (Rev. 1): Inspection and Enforcement by the Regulatory Body for Nuclear Power Plants (1996)		Relatively new draft covering NPPs. Will be expanded to cover other installations starting in 1998.	NUSSAC, RASSAC, WASSAC, TRANSSAC
50-SG-G8: Licences for Nuclear Power Plants: Content, Format and Legal Considerations (1982)		**Revision to start in 1998.**	**NUSSAC, RASSAC, WASSAC, TRANSSAC**
50-SG-G9: Regulations and Guides for Nuclear Power Plants (1984)		Revision to start in 1998.	NUSSAC, RASSAC, WASSAC, TRANSSAC
Quality Assurance			
50-C-Q: Quality Assurance for Safety in Nuclear Power Plants and other Nuclear Installations (1996)		No revision is foreseen prior to 2001 for quality assurance publications.	
50-SG-Q1–Q14: Supporting Safety Guides (1996)			

STATUS OF SAFETY STANDARDS — NUCLEAR SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
Operation of Nuclear Power Plants			
50-C-O (Rev. 1): Code on the Safety of Nuclear Power Plants: Operation (1988)	NS179: Requirements for the Safety of Nuclear Power Plants: Operation	MS comments have been considered by a CS new draft will be sent to NUSSAC for final approval.	NUSSAC
50-SG-O1 (Rev. 1): Staffing of Nuclear Power Plants and the Recruitment, Training and Authorization of Operating Personnel (1991)		Revision to commence in 1998.	NUSSAC
50-SG-O2: In-service Inspection for Nuclear Power Plants (1980) 50-SG-O7 (Rev. 1): Maintenance of Nuclear Power Plants (1990) 50-SG-O8 (Rev. 1): Surveillance of Items Important to Safety in Nuclear Power Plants (1990)	NS273: Maintenance, Testing Surveillance and In-Service Inspection of NPPs (combining O2, O7 and O8)	Document being drafted.	NUSSAC
50-SG-O3: Operational Limits and Conditions for Nuclear Power Plants (1979)	NS185: Operations - Operating limits, conditions & procedures	Document to be modified in response to MS comments. Then to NUSSAC and ACSS.	NUSSAC
50-SG-O4: Commissioning Procedures for Nuclear Power Plants (1980)		Revision to commence in 1998.	NUSSAC
50-SG-O5: Radiation Protection during Operation of Nuclear Power Plants (1983) 50-SG-O11: Operational Management of Radioactive Effluents and Wastes arising in Nuclear Power Plants (1986)	NS187: Safety Guide on Radiation Protection and Radioactive Waste Management in Nuclear power Plants (combining O5 and O11)	Document with RASSAC, NUSSAC and WASSAC for comments.	RASSAC, NUSSAC, WASSAC
50-SG-O9: Management of Nuclear Power Plants for Safe Operation (1984)	NS250: Operating Organization	With MS for comments.	NUSSAC
50-SG-O10: Core Management and Fuel Handling for Nuclear Power Plants (1985)		Revision to commence in 1999.	NUSSAC

STATUS OF SAFETY STANDARDS — NUCLEAR SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
50-SG-O12: Periodic Safety Review of Operational Nuclear Power Plants (1994)		Revision commencing in 1998.	NUSSAC
93: System of Reporting Unusual Events in Nuclear Power Plants		Revision commencing in 1998.	NUSSAC
	NS263: Fire Safety During Operation	Endorsed by NUSSAC Oct. 97. Will be sent to MS for comment.	NUSSAC
	NS251: Modifications to Nuclear Power Plants	Draft reviewed by NUSSAC.	NUSSAC
Design Of Nuclear Power Plants			
50-C-D (Rev. 1): Code on the Safety of Nuclear Power Plants: Design (1988)	NS181: Requirements on the Safety of Nuclear Power Plants: Design	Revised following MS comments, sent to NUSSAC July 1998.	NUSSAC
50-SG-D1: Safety Functions and Component Classification for BWR, PWR and PTR (1979)		Some of the content has been included in NS181 and others in NS252 & NS282.	NUSSAC
50-SG-D2 (Rev. 1): Fire Protection in Nuclear Power Plants (1992)		No revision is foreseen prior to 2000.	
50-SG-D3: Protection System and Related Features in Nuclear Power Plants (1980) 50-SG-D8: Safety-related Instrumentation and Control Systems for Nuclear Power Plants (1984)	NS252: Instrumentation and control for systems important to safety in NPPs (combining D3 and D8)	1st draft to be submitted to NUSSAC in 1998.	NUSSAC
50-SG-D4: Protection against Internally Generated Missiles and their Secondary Effects in Nuclear Power Plants (1980)		No revision is foreseen prior to 1999.	
50-SG-D5 (Rev. 1): External Man-induced Events in relation to Nuclear Power Plant Design (1996)		No revision is foreseen prior to 2000.	
50-SG-D6: Ultimate Heat Sink and Directly Associated Heat Transport Systems for NPPs (1981) 50-SG-D13: Reactor Coolant and Associated Systems in Nuclear Power Plants (1986)	NS282: Reactor Cooling Systems in Nuclear Power Plants (combining D6 and D13)	DPP approved by NUSSAC in April 1998.	NUSSAC

STATUS OF SAFETY STANDARDS — NUCLEAR SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
50-SG-D7 (Rev. 1): Emergency Power Systems at Nuclear Power Plants (1991)		**No revision is foreseen prior to 2000.**	
50-SG-D9: Design Aspects of Radiation Protection for Nuclear Power Plants (1985)		No revision is foreseen prior to 1999.	NUSSAC, RASSAC
50-SG-D10: Fuel Handling and Storage Systems in Nuclear Power Plants (1984)	**NS276: Fuel Handling and Storage Systems in Nuclear Power Plants**	**Will be considered by NUSSAC together with NS181 before submission to ACSS.**	**NUSSAC**
50-SG-D11: General Design Safety Principles for Nuclear Power Plants (1986)	NS253: Design verification and safety assessment	To be submitted to NUSSAC in 1998.	NUSSAC
50-SG-D12: Design of the Reactor Containment Systems in Nuclear Power Plants (1985)		**No revision is foreseen prior to 1999.**	
50-SG-D14: Design for Reactor Core Safety in Nuclear Power Plants (1986)	NS283: Reactor Core Safety in Nuclear Power Plants	DPP approved by NUSSAC in April 1998.	NUSSAC
50-SG-D15: Seismic Design and Qualification for Nuclear Power Plants (1992)		**No revision is foreseen prior to 2000.**	
	NS264: Software for Computer Based Systems Important to safety	Comments on draft received from NUSSAC.	NUSSAC
<u>Siting of Nuclear Power Plants</u>			
50-C-S (Rev. 1): Code on the Safety of Nuclear Power Plants: Siting (1988)		No revision is foreseen prior to 2000.	
50-SG-S1 (Rev. 1): Earthquakes and Associated Topics in relation to NPP Siting (1991)			

STATUS OF SAFETY STANDARDS — NUCLEAR SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
50-SG-S3: Atmospheric Dispersion in Nuclear Power Plant Siting (1980) **50-SG-S4: Site Selection and Evaluation for NPPs with respect to Population Distribution (1980)** **50-SG-S6: Hydrological Dispersion of Radioactive Material in relation to NPP Siting (1985)** **50-SG-S7: Nuclear Power Plant Siting: Hydrogeological Aspects (1984)**	**NS182: Dispersion of radioactive material around NPPs (combining S3, S4, S6 and S7)**	**Work on first draft in progress, to be sent to NUSSAC for review in 1998.**	**NUSSAC**
50-SG-S5: External Man-induced Events in relation to Nuclear Power Plant Siting (1981)	NS258: External man induced events in relation to NPP siting	Comments on draft received from NUSSAC.	NUSSAC
50-SG-S8: Safety Aspects of the Foundations of Nuclear Power Plants (1986)		**No revision is foreseen prior to 2000.**	
50-SG-S9: Site Survey for NPPs (1984)		No revision is foreseen prior to 1999.	
50-SG-S10A: Design Basis Flood for Nuclear Power Plants on River Sites (1983)	**NS280: Design Basis Flood for Nuclear Power Plants on River Sites**	**DPP approved by NUSSAC in April 1998.**	**NUSSAC**
50-SG-S10B: Design Basis Flood for Nuclear Power Plants on Coastal Sites (1983)	NS281: Design Basis Flood for Nuclear Power Plants on Coastal Sites	DPP approved by NUSSAC in April 1998.	NUSSAC
50-SG-S11A: Extreme Meteorological Events in NPP Siting, excluding Tropical Cyclones (1981) **50-SG-S11B: Design Basis Tropical Cyclone for Nuclear Power Plants (1984)**	**NS184: Extreme Meteorological Events in NPP Siting (combining S11A and S11B)**	**Work has begun on first draft to be sent to NUSSAC for review in 1998.**	**NUSSAC**
Research Reactor Safety			
35-S1: Code on the Safety of Nuclear Research Reactors: Design (1992) **35-S2: Code on the Safety of Nuclear Research Reactors: Operation (1992)**	**NS272: Safety Requirements for the Design and Operation of Research Reactors (combining S1 and S2)**	**DPP endorsed by NUSSAC Oct. 97. Drafting in progress. CS in April 98. TCM in Oct. 98.**	**NUSSAC**

STATUS OF SAFETY STANDARDS — NUCLEAR SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
35-G1: Safety Assessment of Research Reactors and Preparation of the Safety Analysis Report (1994)		No revision is foreseen prior to 2001.	
35-G2: Safety in the Utilization and Modification of Research Reactors (1994)		No revision is foreseen prior to 2001.	
	NS259: Safety in the Commissioning of Research Reactors	Approved by ACSS, June 1998. Being prepared for submission to Publications Committee.	NUSSAC
	NS260: Research Reactors: Maintenance, Periodic Testing and Inspections	Approved by ACSS, June 1998. Being prepared for submission to Publications Committee.	NUSSAC
	NS261: Research Reactors: Operational Limits and Conditions	Approved by ACSS, June 1998. Being prepared for submission to Publications Committee.	NUSSAC
	NS262: Design, Operation and Safety Assessment of Spent Fuel Storage for Research Reactors	Approved by ACSS, June 1998. Being prepared for submission to Publications Committee.	NUSSAC

STATUS OF SAFETY STANDARDS — RADIATION SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
115: International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (1996)		No plans for revision before 2001.	
26: Radiation Protection of Workers in the Mining and Milling of Radioactive Ores (1983)	NS17: Radiation Protection of Workers in the Mining and Milling of Radioactive Ores	Draft reviewed by RASSAC-4, March 1998. New draft to be checked by correspondence before sending to MS for Comments.	RASSAC
89: Principles for the Exemption of Radiation Sources and Practices from Regulatory Control (1988)	NS33: Application of the principles for exclusion, exemption and clearance from Regulatory Control	DPP reviewed and agreed by RASSAC-4, March 1998.	RASSAC WASSAC
101: Operational Radiation Protection: A Guide to Optimization (1990)		Revision to start in 1998-99.	RASSAC
107: Radiation Safety of Gamma and Electron Irradiation Facilities (1992)		No revision is foreseen prior to the year 2001.	
	NS22: Radiation Protection in the Medical Exposure	Draft reviewed by RASSAC-4, new draft to be checked by correspondence before sending to MS for Comments.	RASSAC
	NS21: Occupational Radiation Protection in the Decommissioning of Nuclear Facilities	Draft available but on hold. Needs DPP if it is to go ahead.	RASSAC
	NS69: Occupational Radiation Protection: Application of Principles	Approved by ACSS, June 1998. Being prepared for submission to Publications Committee.	RASSAC
	NS85: Occupational Radiation Protection: Assessment of Exposure from Intakes of Radionuclides	Approved by ACSS, June 1998. Being prepared for submission to Publications Committee.	RASSAC
	NS12: Occupational Radiation Protection: Assessment of Exposure from External Sources of Radiation	Approved by ACSS, June 1998. Being prepared for submission to Publications Committee.	RASSAC

STATUS OF SAFETY STANDARDS — RADIATION SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
	NS31: Consumer Products Containing Radioactive Substances	Draft reviewed by RASSAC-4, March 1998. RASSAC to consider outstanding issues of exemption levels by correspondence.	RASSAC
	NS51: Application of the Principles of Radiation Protection to Chronic Exposure Situations	Not yet started. DPP expected 1998.	RASSAC
	NS61: Preventing, Detecting of and Responding to Illicit Trafficking in Radioactive Materials	Draft available as Working Material; reviewed by RASSAC 4, March 1998.	RASSAC
	NS73: Training in Radiation and Waste Safety	DPP agreed by RASSAC-4, March 1998. Drafting under way.	RASSAC WASSAC
	NS113: Quality Assurance in Radiation Protection	Action deferred until ACSS advice is available on QA in general.	RASSAC
	NS114: Safety of Radiation Sources	MS comments being incorporated before re-submission to RASSAC.	RASSAC

STATUS OF SAFETY STANDARDS — RADIOACTIVE WASTE SAFETY			
Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
69: Management of Radioactive Wastes from Nuclear Power Plants (1985)		No revision is foreseen prior to the year 2001.	
78: Definition and Recommendations for the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, 1972 — 1986 Edition		**No revision is foreseen prior to the year 2001.**	
79: Design of Radioactive Waste Management Systems at Nuclear Power Plants (1986)		No revision is foreseen prior to the year 2001.	
105: The Regulatory Process for the Decommissioning of Nuclear Facilities (1990)		**No revision is foreseen prior to the year 2001.**	
108: Design and Operation of Radioactive Waste Incineration Facilities (1992)		No revision is foreseen prior to the year 2001.	
Infrastructure			
111-S-1: Establishing a National System for Radioactive Waste Management (1995)		**To be superseded by NS180.**	
111-G-1.1: Classification of Radioactive Waste (1994)		No revision is foreseen prior to the year 2001.	
	NS286 Application of the Principles of Radiation Protection to the Rehabilitation of Contaminated Areas (practices and interventions)	**DPP approved by WASSAC-4 in December 1997 and by RASSAC March 1998.**	**WASSAC, RASSAC**
	NS161: Management of the Removal of Control of Materials from Regulated Nuclear Activities	DPP approved by WASSAC-5, June 1998. needs approval from RASSAC	WASSAC, RASSAC
Discharges			
	NS285: Discharges of radionuclides into the Environment	**Establishment of the document to be considered further by RASSAC and WASSAC.**	**RASSAC, WASSAC**

STATUS OF SAFETY STANDARDS — RADIOACTIVE WASTE SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
77: Principles for Limiting Releases of Radioactive Effluents into the Environment (1986)	NS25: Regulatory Control of radioactive discharges into the environment	MS comments, March 1998. To be approved by WASSAC by correspondence to go to MS.	RASSAC, WASSAC
90: The Application of the Principles for Limiting Releases of Radioactive Effluents in the Case of the Mining and Milling of Radioactive Ores (1989)		No revision is foreseen prior to the year 2001.	
	NS62: Source and Environmental Monitoring for Radiation Protection of the Public	DPP approved, March 1998, document to be submitted to WASSAC-6, Dec. 98 for approval to send to MS.	RASSAC, WASSAC
Pre-disposal Management			
	NS152: Pre-disposal Management of Radioactive Waste (including Decommissioning)	Reviewed and amended by WASSAC-4. MS comments, March 1998. To be submitted to ACSS after WASSAC approval by correspondence.	WASSAC
	NS159: Pre-disposal Management of Low and Intermediate Level Waste from Nuclear Fuel Cycle Facilities	To be considered by WASSAC-6, Dec. 1998, before submission to MS for comments.	WASSAC
	NS163: Pre-disposal Management of High Level Waste	DPP approved (WASSAC-3). Drafting of document started.	WASSAC
	NS160: Pre-disposal Management of Radioactive Waste from Medicine, Industry and Research	To be considered by WASSAC-6, Dec. 1998, before submission to MS for comments.	WASSAC
	NS257: Decommissioning of Nuclear Power Plants and Large Research Reactors	MS comments incorporated. Approved by WASSAC-5 for transmission to ACSS.	WASSAC, NUSSAC
	NS171: Decommissioning of Nuclear Fuel Cycle Facilities	Drafting to continue, plan submission to WASSAC-6, December 1998 for approval to send to MS.	WASSAC, NUSSAC
	NS173: Decommissioning of Medical, Industrial and Research Facilities	MS comments incorporated. Approved by WASSAC-5 for transmission to ACSS.	WASSAC
	NS284: Safety Assessment for Pre-disposal Waste Management	Reviewed by WASSAC-5, June 1998, to be sent to MS.	WASSAC

STATUS OF SAFETY STANDARDS — RADIOACTIVE WASTE SAFETY			
Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
Disposal			
	NS153: Near Surface Disposal of Radioactive Waste	Approved by WASSAC-4 and by ACSS, June 1998. Being prepared for submission to Board of Governors, Dec. 1998.	WASSAC
111-G-3.1: Siting of Near Surface Disposal Facilities (1994)		No revision is foreseen prior to the year 2001.	
	NS165: Design, Construction, Operation and Closure of Near Surface Repositories	Status of the topic to be discussed by WASSAC-6, Dec. 1998.	WASSAC
	NS166: Safety Assessment for Near Surface Disposal	Approved by WASSAC-4 and by ACSS, June 1998. Being prepared for submission to Publications Committee.	WASSAC
99: Safety Principles and Technical Criteria for the Underground Disposal of High Level Radioactive Wastes (1989)	NS154: Geological Disposal of Radioactive Waste	Revision to start in 1999.	WASSAC
111-G-4.1 Siting of Geological Disposal Facilities (1994)		No revision is foreseen prior to the year 2001.	
	NS168: Design, Construction, Operation and Closure of Geological Repositories	To be considered further by WASSAC in connection with NS169	WASSAC
96: Guidance for Regulation of Underground Repositories for Disposal of Radioactive Wastes (1989)		To be superseded by NS153 and NS154.	WASSAC
	NS169: Safety Assessment for Geological Disposal	To be considered further by WASSAC in connection with NS168	WASSAC
85: Safe Management of Wastes from the Mining and Milling of Uranium and Thorium Ores(1987)	NS277: Management of Waste from Mining and Milling of U/Th ores	DPP approved, WASSAC-4. Draft to be submitted to WASSAC for approval to send to MS.	WASSAC
Rehabilitation			
	NS162: Rehabilitation of Contaminated Areas in Intervention Situations	DPP approved by WASSAC in December 1997 and by RASSAC, March 1998.	WASSAC, RASSAC

STATUS OF SAFETY STANDARDS — RADIOACTIVE WASTE SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
	NS172: Rehabilitation of Areas with Contamination from Past Activities and Accidents, in Intervention Situations.	DPP approved by WASSAC in December 1997 and by RASSAC, March 1998.	WASSAC, RASSAC

STATUS OF SAFETY STANDARDS — TRANSPORT SAFETY

Published safety standards Safety Series no. and title	Safety standards in preparation Working ID and title	Status/Remarks	Committee
ST-1: Regulations for the Safe Transport of Radioactive Material (Requirements) (1996)			
7: Explanatory Material for the IAEA Regulations for the Safe Transport of Radioactive Material 37: Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material	NS245: Advisory material for the regulations for the safety transport of radioactive material (combining 7 and 37)	Final draft being prepared for ACSS consideration.	TRANSSAC
87: Emergency Response Planning and Preparedness for Transport Accidents Involving Radioactive Material	NS246: Emergency response planning and preparedness for transport accidents involving radioactive material.	Member State comments received, draft being prepared for TRANSSAC.	TRANSSAC

PART C

PROVIDING FOR THE APPLICATION OF SAFETY STANDARDS

1. Article III.A.6 of the Statute authorizes the Agency to provide for the application of standards of safety to its own operations and, at the request of a State, that State's activities in the field of atomic energy.

2. The Secretariat discharges this function in a number of ways, as follows:

- by providing safety related assistance;
- by fostering safety related information exchange; and
- by rendering safety related services.

3. Annex C-1 describes recent developments in the *provision of safety related assistance through TC programmes* and Annex C-2 deals with two particular areas of safety related assistance; the *provision of assistance related to the safety of nuclear power plants in countries of eastern Europe and the former Soviet Union, and in countries of south-east Asia, the Pacific and the far east*. Annex C-3 describes recent efforts to *foster safety related information exchange* and Annexes C-4 and C-5 address two important aspects of such information exchange; *the promotion of education and training in nuclear, radiation and waste safety* and *the co-ordination of safety related research and development*, respectively. Annex C-6 describes the status of a number of *safety related services* rendered by the Agency to Member States.

ANNEX C-1

PROVISION OF SAFETY RELATED ASSISTANCE THROUGH THE AGENCY'S TECHNICAL CO-OPERATION PROGRAMME

Background

1. The Agency, pursuant to its Statute, helps Member States to comply with its safety standards through — inter alia — technical co-operation (TC) programmes. In doing so, it attaches high priority to the establishment and strengthening of nuclear, radiation and waste safety infrastructures in Member States.

2. Under its TC programmes, the Agency provides safety related technical assistance in the form of experts' services, equipment and training. The current safety related TC programme includes about 180 national, regional and interregional projects (representing total resources of about US $15.8 million), of which about 45% are devoted to nuclear safety and 55% to radiation and waste safety. In addition, each year about 40 national, regional and interregional workshops and training courses are organized and around 500 applications for fellowships and scientific visits are evaluated (see Annex C-4 and GC(42)/INF/4).

3. The projects cover a very wide range of nuclear, radiation and waste safety issues, from the establishment of basic technical, legislative and regulatory infrastructure for the use of radiation and radioactive materials in medicine, research and/or industry to assistance in further strengthening the much more complex and sophisticated safety infrastructure needed for the development and operation of nuclear reactors.

Nuclear Safety

4. A major extrabudgetary programme on the safety of nuclear power plants in the countries of eastern Europe and the former Soviet Union is due to be completed by the end of 1998; the achievements of this programme are described separately in Annex C-2. A new extrabudgetary programme on the safety of NPPs in south-east Asia, the Pacific and the far east is now under way; this too is described in more detail in Annex C-2.

5. Among the TC projects in the nuclear safety area, a few continuing regional projects warrant special mention:

- A project for strengthening nuclear safety regulatory bodies in countries of central and eastern Europe and the former Soviet Union. During 1997, six group training courses were held, involving more than 80 participants from 13 countries. The project has also made use of the IRRT service (see Annex C-6);
- A project to assist operators in countries of central and eastern Europe in reviewing operational safety performance, including safety assessment. The project provides for relevant OSART and ASSET missions (see Annex C-6), follow-up missions and seminars;
- A project to strengthen the existing capabilities of operating and technical support organizations in the European region to carry out safety analyses for their NPPs. The project operates largely through information exchange and training at technical meetings and regional workshops; for example, workshops were held in 1997 in Slovakia, Slovenia, the Czech Republic and the Russian Federation, the last of these attracting 90 participants from 14 countries; and
- A project to develop collaboration on management issues related to the safe and reliable operation of NPPs in the Asian region. To date, about a dozen workshops and technical expert visits on operational safety have taken place through this project.

6. A new programme, the Integrated Strategy for Assisting Member States in Establishing/Strengthening their Nuclear Safety Infrastructure, aims to make the IAEA's nuclear safety related assistance more focused, solution oriented and cost effective. To this end, a systematic approach to the identification and prioritizing of TC assistance programmes, developed jointly by the Departments of Nuclear Safety and Technical Co-operation, will be followed in implementing the Integrated Strategy.

7. The systematic approach involves the following six stages:

(1) Identification of a focal point for nuclear safety issues in the Member State;

(2) Identification of a Country Nuclear Safety Officer (CNSO) — a member of the Agency's staff — responsible for nuclear safety issues in that State;

(3) Development — jointly by the Agency and the Member State — of a Country Nuclear Safety Profile (CNSP), describing the actual nuclear safety situation in the Member State;

(4) Comparison of the actual situation in the Member State (as described in the CNSP) with a predefined 'reference situation' based on the Agency's Safety Requirements. This review — carried out jointly by the Agency and the Member State — aims to identify the areas where the actual situation falls short of the reference situation, and therefore where Agency assistance could most effectively be applied;

(5) Formulation of an agreed Country Nuclear Safety Action Plan (CNSAP), based on the findings from stage (4), the Member State's priorities and the Agency's ability to provide suitable and effective assistance to the Member State; and

(6) Implementation of the CNSAP.

8. The parts of the Country Nuclear Safety Profiles (CNSPs) on legislative and regulatory framework have been prepared for 22 Member States receiving Agency assistance that have NPPs in operation or are embarking on nuclear programmes. The operational safety parts of the CNSPs are expected to be largely completed by the end of 1998.

9. Work has been completed on the development of questionnaires to facilitate the evaluation of the CNSP against the 'reference situation'. The questionnaires represent the requirements in all five of the NUSS Codes — government organization, siting, design, operations and quality assurance — and are therefore quite extensive, but they have been designed so that, as far as possible, questions require only simple 'yes or no' answers.

Radiation and waste safety

10. A large part of the TC work related to radiation and waste safety is carried out within the Model Projects "Upgrading of Radiation Protection Infrastructure"; in the past year, single interregional project has been split into 5 regional projects. The aim of these projects

is to achieve adequate national radiation and waste safety infrastructures in most participating countries by the year 2000. Fifty-one Member States are participating in the projects, as listed in the following table.

MEMBER STATES PARTICIPATING IN THE MODEL PROJECTS "UPGRADING RADIATION PROTECTION INFRASTRUCTURE"

Africa	West Asia/East Asia	Latin America	Europe
Cameroon	Afghanistan	Bolivia	Albania
Côte d'Ivoire	Bangladesh	Costa Rica	Armenia
Democratic Republic of the Congo	Kazakhstan	Dominican Republic	Belarus
Ethiopia	Lebanon	El Salvador	Bosnia and Herzegovina
Gabon	Mongolia	Guatemala	Cyprus
Ghana	Myanmar	Jamaica	Estonia
Madagascar	Qatar	Nicaragua	Georgia
Mali	Saudi Arabia	Panama	Latvia
Mauritius	Sri Lanka	Paraguay	Lithuania
Namibia	Syrian Arab Republic		Moldova
Niger	United Arab Emirates		The former Yugoslav Republic of Macedonia
Nigeria	Uzbekistan		
Senegal	Viet Nam		
Sierra Leone	Yemen		
Sudan			
Uganda			
Zimbabwe			

11. The Model Projects established a systematic approach to assessing and improving safety infrastructure, which has since been adapted for the Integrated Strategy as described in para. 7 of this Annex. This systematic approach is also now being used in regional TC projects on radiation and waste safety.

12. The majority of the Country Safety Action Plans for the Model Projects were completed by early 1997, and implementation is under way. The first milestone for participating countries was the establishment of systems for the control of radiation sources (including inventories of such sources). To this end, the Secretariat devised a generic system —

adaptable to the conditions in different States — for the notification, registration and licensing of radiation sources and for follow-up inspections of the sources. By the end of 1998, it is expected that over 80% of the participating countries will have approved (or be in the process of approving) legislation and regulations and established systems of notification, licensing and control of sources in accordance with the Basic Safety Standards, and over 70% should have a national inventory of sources. It is expected that all but a very small number of participating States will achieve a reasonable system of control for radiation sources.

14. The set of Country Safety Profiles developed for the Model Projects has provided the IAEA with a fully documented on-line system for assessing the current status of countries with respect to their radiation and waste safety infrastructure, and a prioritized and agreed set of needs that should form the basis of future technical assistance projects. There will also be enough data to assess the capacity of the country to assure the safety of other developments of technology or requested items of equipment that could pose radiation hazards. Over time, the system should provide a firmer basis for the IAEA's co-operative work with its Member States and provision of technical assistance in areas of radiation and waste safety.

15. Three regional TC projects in the radiation and waste safety areas are worthy of note:

- A programme was launched in 1997 on improving occupational radiation protection in nuclear power plants in central and eastern Europe and in Republics of the former Soviet Union. The project aims to improve the implementation of the optimization (ALARA) principle through, inter alia, information exchange meetings of health physicists from WWER and RBMK reactors and training courses on optimization;

- A project to create a nuclear disaster preparedness education programme for central and eastern Europe, including development of a standard curriculum and 'train-the-trainer' courses. The first stage of the project was aimed at emergency medical personnel; and

- A project on harmonization of nuclear emergency preparedness in central and eastern Europe, aimed at developing a common understanding of the appropriate response to a severe reactor accident. This will include developing a system of

early warning based on reactor conditions, and co-ordinating technical and public information responses.

ANNEX C-2

PROVISION OF ASSISTANCE RELATED TO THE SAFETY OF NUCLEAR POWER PLANTS IN COUNTRIES OF EASTERN EUROPE AND THE FORMER SOVIET UNION, AND IN COUNTRIES OF SOUTH-EAST ASIA, THE PACIFIC AND THE FAR EAST

Background

1. The Agency has been providing nuclear power plant (NPP) safety assistance to countries of Eastern Europe and the former Soviet Union under subprogramme H.1.04 ("Safety of WWER and RBMK Plants") of its programme for 1997–1998. This subprogramme includes the provision of technical support to interregional, regional and national technical co-operation (TC) projects. The activities described below have been funded from the Agency's Regular Budget, from TC resources and from extrabudgetary contributions.

2. In addition to the assistance being provided under subprogramme H.1.04 the Agency has, at the request of WWER and RBMK operating countries, provided site specific assistance and advice through a wide range of safety services such as the OSART, ASSET and IPERS services (see Annex C-6).

3. A new Extrabudgetary Programme has been initiated on the Safety of Nuclear Installations in Countries of South-East Asia, the Pacific and the Far East. The main thrust of the new Programme is to strengthen nuclear safety in countries of the region. In particular, the objective is to enhance the technical capabilities of regulatory authorities and the supporting technical organizations and the nuclear safety infrastructure.

Extrabudgetary Programme on the Safety of WWER and RBMK NPPs

4. The Extrabudgetary Programme (EBP) on the Safety of WWER and RBMK NPPs will be completed in December 1998. A comprehensive final report has been drafted by the Secretariat, and will be reviewed by the Programme Steering Committees in June–July 1998.

5. The final report on the EBP provides a detailed overview of the eight years of EBP activities (1990–1998). It describes the IAEA's activities, achievements and outlook related to design and operational safety issues of WWER and RBMK NPPs. It includes systematic referencing to some 300 reports prepared within the framework of the Programme.

6. An Advisory Group will be convened to evaluate the results of the EBP and its final report. The report will then be finalized for presentation at the International Conference on Strengthening of Nuclear Safety in Eastern Europe to be held in Vienna, 14–18 June 1999.

WWER Safety Issues

7. Early in 1998, the IAEA finished the preparation of a list of safety issues for the WWER-1000 models 187, 302 and 338, also known as the 'small series' of first generation WWER-1000 plants. The work, initiated in 1996, was based on reviews carried out by the IAEA for units of this type operating at South Ukraine (units 1 and 2), and Novovoronezh, Russian Federation (unit 5). Nearly all of the generic safety issues identified for the standard model 320 of WWER-1000 NPPs were found to be applicable to the small series.

8. In February 1998, the IAEA completed the compilation of information on the status of safety improvements of WWER-440/230 NPPs. The published report includes details of the remedial actions implemented at each plant in response to the safety issues originally identified by the IAEA, the remaining safety concerns and the future actions planned.

9. In March 1998, the IAEA published a report on Methodology for Qualification of In-Service Inspection (ISI) Systems for WWER NPPs. The report provides a methodology for qualification of ISI systems which could be used for further development of the national infrastructures in countries operating WWER reactors.

RBMK Safety Issues

10. At the end of 1997, work was completed on a list of generic safety issues for RBMKs of the first and second generations. Relevant information on the safety improvements considered and/or implemented for RBMKs of this type was obtained by the IAEA from a technical visit to unit 2 of Leningrad NPP, Russian Federation. Use was also made, during

this later stage of the EBP, of the results of other international activities, particularly those sponsored by the European Commission (EC).

11. An international exercise to validate a set of thermal hydraulic computer codes for selected phenomena relevant to RBMK safety analysis was completed in June 1998. The work was based on experimental results provided to the IAEA by Japan.

Implementation of RBMK Accident Analysis Guidelines (IRAAG)

12. An extrabudgetary project was established in March 1998 concentrating on RBMK accident analysis and related training, based on the Kursk-1 NPP, Russian Federation. The project's primary objective is to verify the applicability of the IAEA's accident analysis guidelines to RBMK reactors. The tasks involved include:

(a) Testing the feasibility of accident analysis methodology;

(b) Performing design basis accident calculations for selected sequences as a necessary means of testing the guidelines, with special attention being paid to beyond design basis accidents; and

(c) Developing and conducting the related training programme.

The project is to be completed by the end of 1999.

Database on WWER and RBMK Safety Issues

13. A database of WWER and RBMK safety issues, and the plant specific status of safety improvements, has been developed as the EBP has proceeded. The database, and particularly the information on the status of backfitting, is updated regularly and is distributed to Member States participating in the Programme every half year. The latest version to be issued soon will include new information received on the status of improving the safety of WWER-440/230 reactors and of the four RBMK reactors at Leningrad NPP, Russian Federation.

G-24 Nuclear Safety Assistance Co-ordination

14. The Secretariat continues to participate as a technical advisor to the G-24 Nuclear Safety Assistance Co-ordination (NUSAC) mechanism, which is intended to identify gaps and overlaps in assistance activities. A meeting of the G-24 Nuclear Safety Plenary Working Group in Brussels in March 1998 discussed, inter alia, the need for the G-24 database of projects to be more strongly linked to the IAEA's listings of safety issues, as used in the database described in para. 13.

Extrabudgetary Programme on the Safety of Nuclear Installations in South-East Asia, the Pacific and the Far East

15. An Extrabudgetary Programme on the Safety of Nuclear Installations in Countries of South East Asia, the Pacific and the Far East has been initiated. The objective of the Programme is to strengthen nuclear safety in countries of the region and in particular to enhance the technical capabilities of regulatory authorities and supporting technical organizations and nuclear safety infrastructure and manpower development. The participating countries are China, Indonesia, Malaysia, the Philippines, Thailand and Viet Nam.

16. The Integrated Strategy for Establishing/Strengthening Nuclear Safety in Member States proposed by the IAEA Departments of Nuclear Safety and of Technical Co-operation (see Annex C-1) will serve as a basis for establishing nuclear safety profiles and action plans for assistance and co-operation, in a step-by-step approach.

17. The Programme will focus on providing assistance for:

- training in nuclear safety;
- strengthening national regulatory frameworks and technical and management capabilities, including nuclear legislation, regulations, safety assessment, licensing, inspection and enforcement;
- emergency planning and preparedness;
- safe storage of research reactor spent fuel;

- promotion of safety culture concepts;
- preparation of information for decision makers and the public to build understanding of and confidence in nuclear safety;
- development and revision of country profiles and specific action plans for prioritizing IAEA assistance in nuclear safety matters related to NPPs and research reactors; and
- establishing a regional forum to exchange information to harmonize the implementation of nuclear safety concepts.

18. A consultative meeting involving representatives of countries in the region was held in Vienna in July 1997 to compile information on the need for assistance in individual countries. The Programme's 'kickoff' meeting took place in Vienna, 20–21 October 1997. Twenty-one participants from 13 Member States attended the meeting. The programme scope and the action plans were agreed.

19. A phased approach is being used in implementing the Programme:

- **Phase 1 (1997–1998):** The objective of this first phase is to strengthen the national capabilities required for ensuring the safety of nuclear installations. This includes the provision of training both at regional and national levels, the development of country nuclear safety profiles and related action plans for Agency assistance. The Agency's safety services would also be made available to countries participating in the Programme in a manner consistent with the Agency's 'Integrated strategy'.
- At the end of this phase, an Advisory Group will be convened, including all countries providing and receiving assistance in the framework of this Programme, to evaluate the results achieved and to discuss future activities. The terms of reference for the Advisory Group have been agreed, and the meeting is scheduled for October 1998.
- **Phase 2 (1999–2000):** The second phase aims at the implementation of country specific action plans and a wider use of IAEA safety services. Close co-

ordination of the Nuclear Safety and Technical Co-operation Departments will ensure optimal use of Agency resources. Regional seminars will be organized to provide a forum for exchange of information and harmonization of national nuclear safety approaches.

20. The Governments of France, Germany, Japan, Spain and the USA are providing cash or in-kind extrabudgetary contributions to support the Programme in 1998.

21. Activities planned for 1998 include two training workshops on nuclear safety in China and South Korea, assistance to China on the safety review of the WWER-1000 NPP in Lianyungang, assistance to Indonesia based on the agreed action plan and completion of country nuclear safety profiles and action plans for the other countries.

ANNEX C-3

FOSTERING OF SAFETY RELATED INFORMATION EXCHANGE

Background

1. Fostering the exchange of information on nuclear, radiation and waste safety is an integral part of the Agency activities aimed at providing for application of the Agency's safety standards. Moreover, Article III.A.3 of the Agency's Statute authorizes the Agency to foster the exchange of scientific and technical information on peaceful uses of atomic energy.

Publications

2. All Agency publications issued in 1997 are listed in the Annual Report (GC(42)/5); a list of safety related publications issued so far in 1998 is provided below.

AGENCY PUBLICATIONS ON NUCLEAR, RADIATION AND WASTE SAFETY
JANUARY–JUNE 1998

Safety of Nuclear Installations	
Examples of Safety Culture Practices	Safety Reports Series No. 1
Equipment Qualification in Nuclear Power Plants: Upgrading, Preserving and Renewing	Safety Reports Series No. 3
Guidelines for the Review of Research Reactor Safety	Services Series SVS-01
Organization and Conduct of IAEA Fire Safety Reviews at Nuclear Power Plants	Services Series SVS-02
Approaches Relating to Decommissioning of Nuclear Facilities: Peer Discussions on Regulatory Practices	PDRP-2
Guidelines for Integrated Risk Assessment and Management in Large Industrial Areas	TECDOC-994
Use of PSA Level 2 Analysis for Improving Containment Performance	TECDOC-1002
Upgrading of Fire Safety in Nuclear Power Plants	TECDOC-1014
OSART Programme Highlights 1995–1996	TECDOC-1018
Use of Computers to Enhance Nuclear Power Plant Diagnosis and Operator Response	TECDOC-1019
Assessment and Management of Ageing of Major Nuclear Power Plant Components Important to Safety: Concrete Containment Buildings	TECDOC-1025

**AGENCY PUBLICATIONS ON NUCLEAR, RADIATION AND WASTE SAFETY
JANUARY–JUNE 1998**

Radiation and Waste Safety	
Diagnosis and Treatment of Radiation Injuries	Safety Reports Series No. 2
The Radiological Situation at the Atolls of Mururoa and Fangataufa: Executive Summary	STI/PUB/1028/ES
Radiological Conditions at Bikini Atoll: Prospects for Resettlement	Radiological Assessment Reports Series STI/PUB/1054
Accidental Overexposure of Radiotherapy Patients in San José, Costa Rica	STI/PUB/1027
The Radiological Accident in Tammiku	STI/PUB/1053
Health Effects and Medical Surveillance	Practical Radiation Technical Manual PRTM-3
Application of Radiation Protection Principles to the Cleanup of Contaminated Areas: Interim Report for Comment	TECDOC-987
Clearance of Materials resulting from the Use of Radionuclides in Medicine, Industry and Research	TECDOC-1000
Compilation of Anatomical, Physiological and Metabolic Characteristics for a Reference Asian Man, Volume 1: Data Summary and Conclusions Volume 2: Country Reports	TECDOC-1005
Dosimetric and Medical Aspects of the Radiological Accident in Goîania in 1987	TECDOC-1009
National Competent Authorities Responsible for Approvals and Authorizations in respect of Transport of Radioactive Material — List No. 29 (1998 Edition)	NCAL-29

3. Two public information booklets on safety related subjects have been issued:

- *Radiation, Health and Society*, by Dr. Björn Wahlström, provides background and explanatory material on radiation effects and protection standards; and
- *Nuclear Tests in French Polynesia: Could Hazards Arise?* summarizes the findings of the International Advisory Committee (IAC) on the present and future radiological conditions at Mururoa and Fangataufa following nuclear weapon testing (see GC(42)/INF/3).

Electronic information systems

4. The Secretariat has for some time been using electronic network systems (especially e-mail) to communicate with Member States. Owing to the limitations of e-mail as a means

of exchanging scientific and technical information, however, the Secretariat is making increasing use of other electronic communication systems, the principal aim being to make available to Member States — especially those which are developing countries — direct access to nuclear, radiation and waste safety information.

5. In particular, a large number of pages are now available on WorldAtom, the Agency's World Wide Web (WWW) site, giving information on safety. The main nuclear safety area includes NUSAFE (www.iaea.org/ns/nusafe/) and RASANET (www.iaea.org/ns/rasanet/). NUSAFE describes the Agency's activities in the safety of nuclear installations, including the extrabudgetary programmes on nuclear safety (Annex C-2) and the provision of safety related services (see Annex C-6). RASANET provides similar information on radiation and waste safety, and includes a number of interactive training modules for individuals using radioactive materials, based on the Agency's Practical Radiation Manuals. Each area also includes details of relevant publications and meetings, and points of contact for further information.

6. A database has been compiled of generic safety issues for NPPs with light water reactors (LWRs) and the measures that have been taken to resolve them. The database reflects broad international experience with all types of LWRs (including relevant information from the database on WWER and RBMK safety issues described in Annex C-2), and is intended for use by Member States as an internationally accepted reference for the safety reassessment of operating plants. The database will be made available to Member States and will be kept up-to-date, particularly with respect to the latest measures for resolving safety issues. A TECDOC describing the main issues and measures taken will also be published.

Conferences, seminars and meetings

7. An important means of fostering the exchange of safety related information is the organization of scientific and technical meetings, ranging from large meetings (such as conferences, symposia and seminars) with broad participation to smaller, specialized meetings (such as Technical Committee meetings) with the participation of selected experts. Information exchanged at such meetings is subsequently made available by the Agency in priced publications such as conference proceedings, or in unpriced ones such as technical

documents (the IAEA TECDOC series). Some such meetings are discussed in other Annexes of this document; a number of other important meetings are described below.

8. An International Conference on *Goiânia: 10 Years Later* was held in Goiânia, Brazil, in October 1997, organized by the Comissão Nacional de Energia Nuclear (CNEN), in co-operation with the IAEA, the state Government of Goiás and the Associação Brasileira de Energia Nuclear (ABEN). About 400 participants attended the Conference, and about 50 technical papers — describing the accident, the lessons learned and subsequent progress towards avoiding such accidents in the future — were presented by experts from 15 countries and the IAEA. Other activities included seven round table discussions on a range of specific topics and a guided tour of some of the places involved in the accident and the subsequent cleanup and monitoring.

9. Understanding of the risks associated with exposure to low doses of radiation is central to the development and implementation of nuclear, radiation and waste safety standards. A major International Conference on *Low Doses of Ionizing Radiation: Biological Effects and Regulatory Control* was held in Seville, Spain, in November 1997, jointly organized by the IAEA and the World Health Organization (WHO), in co-operation with the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), to review the current state of scientific knowledge on the risks of exposure to low doses and current thinking on the regulation of these risks. Over 500 participants from 65 countries attended the Conference, and there was lively and wide-ranging debate on the issues. The conference demonstrated that much remains to be learnt about the effects of low doses, and identified a number of new and promising areas of radiobiological and epidemiological research. However, on the basis of current knowledge, it was concluded that the currently accepted hypothesis — that any incremental dose of radiation, no matter how small, carries with out a proportionate increase in risk — remains the most radiobiologically defensible basis for radiation protection and regulation. The conference further concluded that regulatory approaches based on this hypothesis can provide rational and responsible management of the risks from radiation.

10. A Symposium on *Upgrading the Fire Safety of Operating Nuclear Power Plants* was held in Vienna in November 1997. The Symposium focused on a number of fire safety reviews and audits as a means of identifying deficiencies, and on the process of choosing and

implementing appropriate safety improvements. Papers from the Symposium are collected in TECDOC-1014 (see table above).

11. An International Conference on the Radiological Situation at the Atolls of Mururoa and Fangataufa was held in Vienna in June–July 1998, to present the findings of the international study (see GC(42)/INF/3).

12. Two major safety related conferences sponsored or jointly sponsored by the Agency are taking place later in the second half of 1998:

- An IAEA International Conference on Topical Issues in Nuclear, Radiation and Waste Safety, due to be held in Vienna from 31 August to 4 September 1998. The Conference will discuss six issue papers; each of these papers, prepared in advance and reviewed by international groups of experts, will cover a major topical issue in nuclear, radiation or waste safety:
  - — Safety management;
  - — Backfitting, upgrading and modernization of NPPs;
  - — Regulatory strategies;
  - — Trends and developments in occupational radiation protection;
  - — Chronic exposure situations; and
  - — Long-term safety for waste disposal

  The issue papers will be complemented by invited keynote presentations and contributed papers. A summary of the main conclusions from the Conference will be issued as an Addendum to the present document.
- Ar International Conference on the Safety of Radiation Sources and the Security of Radioactive Materials — co-sponsored by the Agency, the European Commission (EC), the International Criminal Police Organization (Interpol) and the World Customs Organization (WCO) — was due to be held in Dijon, France, in the week before the General Conference.

The Incident Reporting System (IRS)

13. The Incident Reporting System (IRS) is an international system jointly operated by the IAEA and the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD/NEA). The objective of the system is to ensure proper worldwide reporting and feedback on events of safety significance in nuclear power plants, so that the lessons learned are disseminated widely and can help to decrease the frequency and consequences of undesirable events and to prevent serious accidents. All 31 of the States with operating nuclear power plants participate in the IRS, along with 10 other countries considering embarking on nuclear energy programmes. Although the IRS was established primary by regulatory bodies and governmental organizations, the information that it handles is generally available to the nuclear industry of member countries.

14. Each report is entered into the IRS database, a computerized system for the preparation, storage, dissemination, searching and retrieval of event reports (full text, illustrations and annotations). A CD-ROM of the relevant software with the up-to-date full text and image database is sent out to participants on a quarterly basis. It is intended to produce a periodic publication on IRS activities, aimed at national and international decision makers and members of the public, making IRS activities more visible and understandable.

15. Almost 2700 reports have been received by the IRS since 1980. The annual number of events reported varies around an average number of 130 reports.

Review and analysis of reported events

16. An annual IRS Highlights document is intended to draw attention to important lessons learnt from events, which during 1996–1997 included the following event causes:

— errors in testing, communication, work planning and management;

— procedural deficiencies in maintenance and testing;

— inadequate guidance in procedures for taking safety systems out of operability during transients; and

— failure modes and effects analysis failing to identify the significance of components.

Events involving procedure compliance, control of maintenance and control of modifications made up a significant portion of the IRS reports for 1996–1997 in the area of management of safety.

17. The 1998 meeting of national IRS co-ordinators, in addition to providing presentations and in-depth discussion on recent events in NPPs noted that:

— human behaviour continues to contribute to events in unexpected ways;

— safety significant events in shutdown modes continue to occur;

— increasing competition in the energy industry leads to frequent modifications, and these can lead to events — a number of events caused by modifications were reported at the meeting;

— external effects events constitute a good portion of the presented events; and

— some new events involving problems with cracks and valves occurred.

IRS guidelines

18. New joint IAEA–NEA reporting guidelines have been published, superseding the guidelines in Part II of IAEA Safety Series No. 93. Among other improvements, the joint guidelines make the reporting requirements and coding as compatible as possible with the event reporting system operated by the World Association of Nuclear Operators (WANO). The IAEA is currently updating and extending the material in Part I of Safety Series No. 93, to provide guidance on establishing national feedback systems for operational safety experience, including identifying the various organizations involved in the process, their roles and responsibilities.

Incident Reporting System for Research Reactors (IRSRR)

19. At the time of writing (July 1998), 18 Member States have notified the Agency of their participation in the IRSRR (compared to seven at this time last year). The participating

States are Argentina, Austria, Belgium, Brazil, Canada, Chile, China, Egypt, Finland, France, Germany, Hungary, Pakistan, Portugal, Slovenia, Tunisia, Turkey and Yugoslavia.

20. A first meeting of the Technical Officers of the participating countries is planned for early next year.

The International Nuclear Event Scale (INES)

21. INES is now used by 59 countries for facilitating rapid communication between the nuclear community, the media and the public regarding the significance of events at nuclear installations associated with the civil nuclear industry or occurring during the transport of radioactive materials to and from such installations.

22. During 1997, the Agency received and disseminated information relating to 45 events (30 of which occurred in 1997, 13 in 1996 and 2 in 1995) in 21 States — 32 at NPPs and 13 at other nuclear facilities. The INES ratings of the events were as follows:

Level 0 (below scale, i.e. safety relevant, but of no safety significance):	12
Level 1 (anomalies):	16
Level 2 (incidents):	15
Level 3 (serious incidents):	2

No accidents (Level 4 or above) were reported in 1997. As in previous years, the most frequent initiating failures in the events reported were fires and overexposure of workers.

23. The INES information service organized a Technical Committee Meeting in Vienna in October 1997 to benefit from feedback from the 59 INES national officers related to their experience in using the INES rating procedures. The objective is to finalize in the course of 1998 the official INES leaflet, the user's manual and the INES automatic rating computer software. A Consultants' Meeting in October 1997 reviewed the technical rating of the events disseminated by the INES information service.

ANNEX C-4

PROMOTION OF EDUCATION AND TRAINING

Background

1. Education and training are essential in providing for the application of the Agency's safety standards. The Agency's policy in education and training in this field was developed in response to the 1991 General Conference Resolution GC(XXXV)/RES/552. The Agency, through its Technical Co-operation and Nuclear Safety Departments, promotes education and training by organizing, in collaboration with organizations in host countries, courses of an 'educational' nature covering a broad range of nuclear, radiation and waste safety issues, and more specialized training courses and workshops covering specific subject areas. The Agency also promotes education and training through other mechanisms, such as sponsoring fellowships and scientific visits and publishing educational and training materials.

2. A substantial amount of training is also carried out by the Agency at the national level in the course of providing safety related assistance (e.g. through the Model Project and other TC projects) and safety related services (e.g. training aspects of OSART missions, ASSET and ASCOT seminars). Examples of such training are discussed in the relevant parts of Annex C-1 and Annex C-6 respectively.

Educational courses

3. Since the last session of the General Conference, a nine-week Basic Professional Training Course on Radiation Protection has been held in Arabic for the first time, in the Syrian Arab Republic, October–December 1997. The equivalent course in English was held in Germany in September–October 1997.

4. A Post-Graduate Regional Training Course on Radiation Protection and Nuclear Safety (in Spanish), continues to be held annually in Buenos Aires, Argentina. This year's course, which runs from March–October 1998, is the 21st.

Specialized training courses and workshops

5. All of the training courses held in 1997 are listed in the Agency's Annual Report (GC(42)/5); safety related regional and interregional training courses in the first half of 1998 are listed in the following table:

REGIONAL AND INTERREGIONAL TRAINING COURSES AND WORKSHOPS JANUARY–JUNE 1998

Title	Host Country	Date
Interregional Courses and Seminars		
Interregional Training Course on *Advances in Monitoring, Assessment and Enhancement of Operational Safety of Nuclear Power Plants*	USA	February 1998
Interregional Seminar: *Technical Workshop II on Operational Experience Feedback and Self Assessment of Operational Safety*	Pakistan	April 1998
Interregional Training Course on *Operator–Regulatory Interface for Nuclear Power Plant Safety*	USA	April–May 1998
Interregional Training Course on *Regulatory Aspects and Safety Documentation of Research Reactors*	Canada, USA	May–June 1998
Regional Courses and Workshops		
Regional Training Course on *Medical Education and Interregional Harmonization Programme for Nuclear Accident Preparedness (Echo 2)*	Russian Federation	January 1998
Regional Training Course on *Radiation Protection in Medicine: Protection against Occupational, Medical and Public Exposure*	India	February 1998
Regional Training Course on *System for Notification, Authorization (Registration and Licensing) and Inspection of Radiation Sources*	Australia	February 1998
Regional Training Workshop on *Nuclear Safety*	China	March 1998
Regional Training Workshop on *Environmental Radiation Measurements using Spectrometric Methods*	USA	March 1998
Regional Training Course on *Notification, Registration, Licensing and Control of Radiation Sources*	Cuba	March 1998
Regional Training Course on *Radiation Protection and Nuclear Safety*	Argentina	March–October 1998
Regional Training Workshop on *Implementation and Management of ALARA in Nuclear Power Plant Operation*	Austria	April 1998
Regional Workshop on *Regulatory Authority Information System*	Peru	April 1998

**REGIONAL AND INTERREGIONAL TRAINING COURSES AND WORKSHOPS
JANUARY–JUNE 1998**

Title	Host Country	Date
Regional Training Workshop on *Emergency Planning and Preparedness*	South Africa	April–May 1998
Regional Training Course on *Operating Experience Feedback*	China	May 1998
Regional Train-the-Trainers Workshop on *Planning and Preparedness, Accident Assessment and Response to Reactor Accidents*	Slovakia	May 1998
Regional Train-the-Trainers Workshop on *Planning and Preparedness, Accident Assessment and Response to Reactor Accidents*	Belarus	May 1998
Regional Training Workshop on *Radiation Protection in Mining and Milling*	Zambia	June 1998
Regional Training Course: *Management Workshop on Operational and Safety Issues of Nuclear Power Plants*	China	June 1998
Regional Training Course on *Qualification and Training with Special Focus on Training the Trainers*	Republic of Korea	June 1998
Regional Training Course on *Medical Education and Interregional Harmonization Programme for Nuclear Accident Preparedness (Echo 3)*	Republic of Moldova	June 1998
Regional Training Course on *Notification, Registration, Licensing and Control of Radiation Sources*	Belarus	June 1998

6. As part of one of the projects on Strengthening Radiation Protection Infrastructures, a distance learning course on radiation protection is being developed in co-operation with, and co-ordinated by, the Australian Nuclear Science and Technology Organization (ANSTO). During the first half of 1998, a trial was carried on with 22 students from the Republic of Korea, Thailand, the Philippines and New Zealand, and an evaluation workshop was held in June 1998 to recommend improvements. A second trial is under way, with revised training material and more students, including from the Open University in the Philippines.

Other mechanisms for education and training

7. In addition to providing courses, seminars and workshops, the Agency promotes education and training by arranging fellowships and scientific visits for scientists and engineers from Member States and by producing educational and training materials.

Fellowships and scientific visits

8. During the period July 1997–June 1998, the Agency received and evaluated almost 500 applications for fellowships and scientific visits related to nuclear, radiation and waste safety, from about 60 countries. After evaluation, placement of applicants can take up to several months, and therefore the exact number of successful applications is not known at the time of writing, but past experience suggests that approximately 70% of applications result in placements.

Educational and training material

9. A Standard Syllabus for the Agency's nine-week Basic Professional Training Course on Nuclear Safety has been prepared, containing 20 modules. The aim has been to develop a basic course suitable for graduate engineers and technical staff with a basic knowledge of nuclear engineering and a few years' experience in the field of nuclear safety. Individual modules can also be used as the basis for specific workshops on particular subjects for more experienced experts. The long term aim is that Member States will be able to arrange their own basic training courses using the Standard Syllabus.

10. A standard syllabus and set of lecture notes for Agency training courses on Regulatory Control of Nuclear Power Plants will be used for the course at Karlsruhe, Germany in September 1998. Feedback from the course will be used to refine these materials for publication as a training manual.

11. At its March 1998 meeting, the Radiation Safety Standards Advisory Committee (RASSAC) approved the development of an IAEA Safety Guide on Training in Radiation and Waste Safety. A draft has been prepared by consultants, and is expected to be finalized by an Advisory Group Meeting in autumn 1998. The Safety Guide covers training on radiation safety and on the radiation protection aspects of transport and waste safety, and addresses responsibilities for training, qualifications and competencies, strategy for human resources development and the establishment of training programmes.

12. IAEA Technical Report No. 280, "Training Courses on Radiation Protection", is being revised and will include updated standard syllabi for Agency training courses. A multimedia package for training courses entitled "Radiation Safety: an Overview", including a video, CD-ROM and brochure, is also being developed.

ANNEX C-5

SUPPORT FOR SAFETY RELATED RESEARCH AND DEVELOPMENT

Background

1. The Agency supports research and development related to nuclear, radiation and waste safety mainly through Co-ordinated Research Projects (CRPs). The CRPs are intended to optimize the use of research and development resources by ensuring that researchers co-ordinate their work with that of researchers in related areas. Each CRP includes a number of contracts and agreements (typically about 10–20) with individual institutions in Member States, and typically runs for 3–5 years. Research Co-ordination Meetings (RCMs) between the participating institutions are held at the beginning of, during, and at the end of the CRP to plan the work, discuss progress and report on results achieved.

2. At the time of writing (mid-1998), there were 24 CRPs active, involving over 250 individual contracts and agreements. The following table lists the CRPs in progress, indicating the planned completion dates, and the number of countries participating.

CO-ORDINATED RESEARCH PROJECTS IN PROGRESS (as of 1998-06-30)

Project title	Start–End	Countries participating
Radiation and Waste Safety		
Management of ageing of in-containment instrumentation and control cables	1992–1998	12
Assessment of the safety of uranium hexafluoride (UF_6) transport packages in fires	1992–1998	5
Radiation protection in diagnostic radiology in Asia and the Far East	1994–1998	11
Radiation protection in diagnostic radiology in eastern European countries	1994–1998	10
Limitations of radioepidemiological assessments for stochastic radiation effects in relation to radiation protection	1994–1998	2
Development of relevant accident data for quantifying risks associated with the transport of radioactive material	1994–1998	8
Accident severity at sea during the transport of radioactive material	1994–1998	6

CO-ORDINATED RESEARCH PROJECTS IN PROGRESS (as of 1998-06-30)		
Project title	Start–End	Countries participating
Regional personal dosimetry intercomparison	1996–1998	9
Intercomparison of in vivo counting systems using a reference Asian phantom	1996–1999	10
International Programme on Biosphere Modelling and Assessment Methods (BIOMASS)	1996–2002	9
Intercomparison for individual monitoring of external exposure from photon radiation	1996–2000	14
Improvement of Safety Assessment Methodologies for near surface disposal facilities for radioactive waste (ISAM)	1997–2000	17
Formulation of Approaches to Compare the potential impacts of wastes from electricity general technologies (FACTS)	1997–2000	10
Intercomparison and biokinetic model validation of radionuclide intake assessment	1997–2000	22
Development of radiological basis for the transport safety requirements for low specific activity material and surface contaminated objects	1997–2001	5
Cytogenetic biodosimetry	1998–2000	20
Accident severity during air transport of radioactive material	1998–2001	6
Safety of Nuclear Installations		
Comparative health and environmental risks of nuclear and other energy systems, using case studies	1994–1998	11
Application of non-destructive testing and in-service inspection to research reactors	1995–1998	7
Validation of accident and safety analysis methodology	1995–1999	11
Development of methodologies for optimization of surveillance testing and maintenance of safety related equipment at nuclear power plants	1996–1999	14
Round-robin exercise on WWER-440 RPV weld metal irradiation embrittlement and annealing	1996–1999	7
Investigation of methodologies for incident analysis	1997–2000	14
Safety of RBMK nuclear power plants in relation to external events	1997–2000	6

3. Several new CRPs have started since the last session of the General Conference:

- "Investigation of Methodologies for Incident Analysis" will review operating experience from NPPs, with special emphasis on root cause analysis of unusual events to prevent recurrence. The CRP will identify the strengths and weaknesses

of existing methodologies and develop a harmonized set of root cause analysis methodologies for particular application areas;

- "Safety of RBMK Nuclear Power Plants in relation to External Events" will study a chosen prototype RBMK to evaluate the seismic capacity of structures, equipment and distributions systems, and the capacity of structures for impact-type blast loadings;

- The ISAM project — "Improvement of Safety Assessment Methodologies for Near Surface Disposal Facilities for Radioactive Waste" — aims to develop and illustrate a systematic method for selecting scenarios for assessments, to investigate approaches to formalizing the conceptual model development process, to investigate the effect of quality assurance on the reliability of assessments and to develop a consistent and complete set of generic data for assessments.

- The FACTS project — "Formulation of Approaches to Compare the Potential Impacts of Wastes from Electricity Generation Technologies" — will co-ordinate the collection, evaluation and development of data sets on waste quantity, composition and physical/chemical form for different electricity generation fuel chains, and will formulate and illustrate approaches for comparing the health and environmental impacts of the different wastes.

- "Cytogenetic Biodosimetry" will review the available methods and current findings on bioindicators which may be of practical use, and will identify promising techniques. This is intended to provide Member States with agreed up-to-date advice to assist them in focusing research, and with suggestions of the most suitable techniques for practical biodosimetry.

- "Accident Severity during Air Transport of Radioactive Material" will collate and analyse data from different sources on the frequency and severity of aircraft accidents, with the aim of estimating probabilities of different types of accident. The analysis of the data will include consideration of the type of impact, the temperature and duration of fire after impact and the crush forces from the aircraft structure, other cargo, etc.

ANNEX C-6

RENDERING OF SAFETY RELATED SERVICES

Background

1. The Agency provides a range of services to Member States related to nuclear installation safety, which are discussed in turn in this Annex:

- the Operational Safety Review Team (OSART) service;
- the Assessment of Safety Significant Events Team (ASSET) service;
- the Engineering Safety Review Service (ESRS);
- the International Peer Review Service (IPERS) for probabilistic safety assessments;
- the Integrated Safety of Research Reactors (INSARR) service;
- the Assessment of Safety Culture in Organizations Team (ASCOT) service; and
- the International Regulatory Review Team (IRRT) service.

The provision of such services to developing countries is supported by the Agency's technical co-operation programme; for services to developed countries, the costs are borne by the countries themselves.

2. Work is under way to tailor the various attributes of the ASCOT, ASSET and OSART programmes to the needs of the user. For example, a combined ASSET–OSART mission will take place late in 1998. The results of the ASSET event analysis process will be an input to the OSART, which itself will be tailored to the needs of the specific facility. Some Agency staff will perform both the ASSET and OSART activities, thus beginning the process of developing staff capability in all services. This mission is scheduled to take three weeks, whereas the separate missions would together occupy a four-week period. Delivery of workshops to transfer OSART and ASSET methodology is being given high priority, thus

enabling the customer to perform self-assessments. The Agency then offers a service to assess the effectiveness of the self assessment process. Safety culture seminars (ASCOT) are being given where requested and are being well received. As the managerial ability to develop and maintain a good safety culture is so crucial, development is underway to build more of the Safety Management aspects into all services. It is hoped to be able to provide some measure of this vital component of managing a nuclear facility in OSART or separate services by the end of 1999.

3. An additional nuclear safety related service for Member States, the Review of Accident Analysis, is now being offered by the Agency. This service will follow a similar format to that of the services listed above: at the request of a Member State, the Agency will organize international expert missions to review the Member State's own accident analyses or hold seminars on accident analysis methodology and its application.

4. The Agency also carries out, as a service to its Member States, radiological assessments of sites where residual radioactive material is present, e.g. as a result of an accident, past waste management practices or nuclear explosions.

The Operational Safety Review Team (OSART) Service

5. In the past twelve months, four OSART missions, four follow-up missions and four preparatory meetings for future missions have been carried out. Also, staff of the Agency's Operational Safety Unit participated in a visit to Kazakhstan, including discussions with the regulator and representatives of the BN-350 NPP, to determine the assistance needed and develop an action plan to enhance nuclear safety. Five visits to NPPs were conducted to provide technical assistance in improving nuclear safety as preparation for, or as a consequence of the gaps in performance identified by, OSART missions. Five seminars on the OSART methodology were also held to assist plant staff, and in one case regulatory personnel, in implementing and/or enhancing operational self-assessment.

OSART mission findings

6. The four OSART missions were to the NPPs at Yonggwang in the Republic of Korea, Embalse in Argentina, Paluel in France and Ascó, Spain. A common feature found by all of these missions was that management was committed to the improvement of operational safety

and that plant personnel were experienced and motivated. Several examples of good practice were identified in these missions, together with recommendations and suggestions offered by the mission teams to improve nuclear safety. These will be made available to the nuclear industry through the OSMIR database and OSART highlights reports.

7. Particular areas where the OSART missions identified a need for improvement in one or more of the plants were as follows:

- In some plants, senior management needed to reinforce management expectations through more involvement in plant activities, such as staff training and a more proactive presence in the field;
- In two plants, the training programme was found not to have been completely realized, or not to cover all areas of activities of the plant;
- In two of the plants, the operational experience feedback programme was found to need expansion in scope and depth;
- In one plant, striving for excellence relied too heavily on long standing individual relationships, verbal communications and informal management processes. In another plant, management was found to be content with only satisfactory performance;
- In one plant, operations and maintenance practices were found to need improvement. In another plant, the quality and control of documents and recorded information were not sufficient to ensure the appropriate use or accuracy of information.

OSART follow-up missions

8. OSART follow-up missions are conducted as an integral part of the OSART process, approximately 18 months after the main OSART mission. The OSART follow-up visits to Beznau (Switzerland), Bohunice (Slovakia), Daya Bay (China) and Dampierre (France) demonstrated the effectiveness of the OSART service and the commitment of the plants to implement improvements recommended by the OSART team. The review of actions taken by the plants to correct issues identified revealed that close to 90% of the issues were either

totally resolved or satisfactory progress had been made. For around 10% of the issues the progress was considered insufficient. In some cases it was noticed that the corrective measures implemented went beyond the recommendations made by the OSART mission, to look for deeper root causes and to address a more comprehensive set of issues related to those root causes.

Development of the OSART programme

9. As a result of the recommendations made by a Consultants' Meeting in the framework of the Programme and Performance Assessment System (PPAS), several actions have continued over the past year. The most significant of these are as follows:

- the integration and co-ordination of OSART with the other operational safety services, such as ASSET, IRRT, INSARR and ASCOT (a combined ASSET–OSART mission will take place in November–December 1998 to the BN-350 NPP in Kazakhstan);
- more focused assistance on self-assessment of operational safety (including seminars on the OSART methodology);
- more technical assistance in improving nuclear safety (technical visits to assist NPPs with improvements recommended by OSART missions);
- OSART missions more tailored to the particular Member State's needs are being offered (and conducted); and
- Improvements in the OSART process to more adequately cover safety culture and safety management are under development.

A high priority is being place on updating the nuclear safety standards (NUSS) documentation together with upgrading the OSART guidelines.

The Assessment of Safety Significant Events Team (ASSET) Service

10. Since 1995, as recommended by the Member States, the Agency has been promoting plant self-assessment through training and analysis missions based on the ASSET root causes

analysis methodology. This methodology addresses the plant's safety performance via analysis of the plant's demonstrated ability to analyse and correct the causes of events.

11. Fourteen missions have been conducted since the last session of the General Conference, at the request of 11 different Member States: Armenia, Bulgaria, Canada, Egypt, Hungary, Kazakhstan, Lithuania, Spain, Sweden, Ukraine and the United Kingdom. The missions concerned reactors of a wide range of types: WWER, CANDU, FBR, RBMK, PWR, BWR, AGR and research reactors.

12. Of the 14 missions, two — to Rovno, Ukraine, and Kozloduy, Bulgaria — were devoted to peer reviews of the results of plant self-assessment of its safety performance via event analysis and corrective measures. The other 12 missions were devoted to training of nuclear professionals to develop their self-assessment capability. Some of these training missions were focused primarily on self-assessment of consequences (e.g. those to Paks, Hungary and the two research reactors in Egypt), others on self-assessment of root causes (e.g. those to Ignalina, Lithuania, Hartlepool, UK and South Ukraine and Chernobyl, Ukraine).

13. Five ASSET analysis missions to peer review plant self-assessments will take place during the second half of 1998, to Ukraine (Chernobyl and South Ukraine), Finland (Olkiluoto), Romania (Cernavoda) and Kazakhstan (Aktau BN-350). The mission to Kazakhstan will be combined with an OSART mission, the results of the assessment of event analysis and corrective programmes feeding directly into the OSART process.

ASSET mission findings

14. The dominant trends observed in 1997 at the nuclear installations visited by the ASSET service are the following:

- Self-assessment capabilities have steadily developed over the past years;
- Appropriate solutions are being applied to safety problems related to equipment operability; and
- Safety problems related to personnel proficiency and adequacy of procedures are still of concern, but appear to be decreasing.

Development in the ASSET programme

15. A Technical Committee Meeting was held in Vienna to refine the ASSET Guidance for Self Assessment, using feedback from the users of the ASSET service and from experts serving on mission teams.

The Engineering Safety Review Service (ESRS)

IAEA Service Series Publications on Organization and Conduct of Services

16. Five specific services are included under the general heading of Engineering Safety Review Services; these relate to fire safety, ageing management, design safety, seismic safety and software important to safety. Documents on the organization and conduct of each of these services have been prepared. The document for fire safety has already been published in the new IAEA Safety Services Series, and those concerning ageing management and design safety are in print. Documents for the conduct of services for seismic safety and software important to safety are nearly ready for publication.

Seismic Safety Review Services

17. This service includes missions and workshops related to site safety and safety of nuclear installations in relation to all external hazards.

18. A Workshop was held in Beijing, China, on the seismic safety of WWER-1000 type NPPs with the aim of familiarizing the Chinese specialists with specific issues concerning this design. Experience of these plants gathered in eastern Europe was transferred (although the proposed design for use in China is somewhat different and more advanced). The construction of several units of this type of plant in planned at the Lianyungang site on the Yellow Sea. Three months after this Workshop, a Seismic Safety Review of the Lianyungang site was performed. This review took place in Nanjing and at Lianyungang.

19. A Workshop was held in Moscow on the Modelling of External Events for PSA. This regional workshop was mainly aimed at eastern European specialists. The scope of the workshop included internal fires and floods.

20. A follow-up review of the Armenia NPP was performed. The subjects of the review included the seismic input, but there was more emphasis on the evaluation of seismic capacity of structures, systems and components. The evaluation is still continuing and one more review is scheduled for the end of this year. The seismic upgrading programme will start after the evaluation is completed.

21. Seismic input and the tectonic stability of the Kanupp NPP in Pakistan was also reviewed. This is an operating plant, commissioned in 1972. The original seismic design will be enhanced and there will be some evaluation work to demonstrate the seismic capacity of the existing structures, systems and components.

22. Site safety of a Chinese-designed demonstration nuclear plant for sea water desalination in Tantan, Morocco was reviewed. This is a 10 MW(th) plant, and one of the tasks of the review was to define the criteria to be used in the review. The follow up of this review will be performed in the second half of 1998.

23. Two preparatory review missions were performed, one to Juragua, Cuba, for the site safety of the plant, and another to Tehran, Iran, to discuss the needs for review of the planned WWER NPP at Bushehr.

Design safety review services

24. A Design Review Workshop was held in Ankara, Turkey, to assist the Turkish Atomic Energy Authority in their evaluation of the safety of the design for the proposed Akkuyu NPP, which will be submitted to them by the utility TEAS next year. As the design will depend on the result of the bid evaluation, both light water and heavy water design issues were addressed.

Fire safety review services

25. A review of the fire safety PSA for Krško NPP in Slovenia was carried out in Ljubljana and Krško, using IPERS guidelines. A review of the external events PSA (including internal floods) had already been performed, but at the time of that review the fire PSA had not been completed.

The International Peer Review Service (IPERS) for Probabilistic Safety Assessments

Missions

26. Three IPERS missions have been carried out since the last session of the General Conference. Two of these were to the Krško NPP in Slovenia: the first, in November 1997, to review the level 2 PSA and the second, in June 1998, to review the fire PSA. The other mission, in December 1997, was to review the level 1 PSA (including fire and seismic analyses) for Units 3 and 4 of the Kozloduy NPP in Bulgaria.

27. The IPERS team that reviewed the Kozloduy level 1 PSA found that very extensive and comprehensive work had been done in many PSA areas. The PSA team was found to have a good knowledge and understanding of PSA methods and techniques, and of the study performed. Some of the mission findings were related to the documentation and the quality assurance of the study, and to the status of the plant that the study was representing. Other findings concerned the analyses of accident sequences, human reliability and common cause failure and hazards.

28. The technical content of the Krško level 2 PSA was found to be impressive and to reflect a good understanding of the issues important to a credible assessment of severe accident behaviour, containment performance, and fission product source terms. The main findings were related to the interface between the level 1 and level 2 analyses (mainly regarding the modelling and treatment of human errors) and its impact on the final results, and to the containment structural analysis.

29. The fire PSA for Krško was also found to be very comprehensive. The PSA was used for the development of an action plan to improve fire safety at the plant, and identified a list of highest-priority improvements. It was recommended that the fire PSA should be repeated for the new configuration after all of the major backfits in the action plan have been installed, and that an overall plant risk profile should now be developed.

Related Activities

30. The IAEA has, during the past three years, been working intensively on PSA applications. One of the most significant activities of this project was a Technical Committee Meeting on PSA Applications to Improve NPP Safety, held in Madrid, Spain, in February 1998.

The meeting was organized in co-operation with the Spanish Nuclear Safety Council (CSN) and the Union of Spanish Electrical Utilities (UNESA). This TCM was attended by more than 80 participants from 29 countries and some 40 papers were presented. The main conclusions from the meeting can be summarized as follows:

— Living PSAs should provide the basis for a risk based approach to decision making;

— The development and use of risk monitors as tools for configuration management is spreading rapidly;

— The use of PSA to support NPP testing and maintenance is one of its the most popular applications The idea of focusing maintenance efforts on the most safety significant components, systems and structures seems very appealing to the nuclear community;

— Plant specific PSAs are being used to support the WWER safety upgrading programmes; and

— Not all countries have a regulatory framework for the use of the probabilistic approach in decision making. Some countries are still far from having 'risk informed' regulation. Therefore there is still considerable work ahead, both for regulators and utilities to clarify approaches, to establish a framework and to reach a common understanding in relation to the use of PSA in decision making.

31. The Agency has made a considerable effort to support the development of technical capabilities for PSA in Member States. A workshop on PSA Requirements was held in March 1998 in Beijing, China. This activity was organized by the IAEA in the framework of the extrabudgetary programme on the safety of nuclear installations in Asian countries (see Annex C-2 of this document), and was hosted by the Beijing Institute of Nuclear Energy (BINE). Although the seminar had been designed mainly for the group that will be involved in the PSA activities for the Lianyungang NPP (a new WWER-1000 plant), participants from other PSA groups in China also attended. The objective of this seminar was to present and discuss requirements for level 1 PSA. The seminar covered all the areas and tasks of a level 1 (internal events and hazards) PSA. Special attention was paid to the documentation of the different PSA tasks and to the quality assurance of the whole PSA development process.

Sessions on Level 2 PSA and PSA Applications were also included in the seminar programme.

The Integrated Safety Assessment of Research Reactors (INSARR) Service

32. In the past year, several developed countries have for the first time requested the INSARR service, to review the safety of existing reactors or of plans to construct new facilities. The INSARR missions initiated by the Agency or invited by Member States in 1998 included visits to the MPR-30 reactor in Indonesia (which was not visited by the last mission to Indonesia in 1994), the BR-2 reactor in Belgium and the TRIGA reactor in Finland, and a special review mission associated with the plans for construction of a new facility in Australia. All of these missions are scheduled for the second half of 1998.

33. Other developed countries have indicated that they may request advisory missions in the near future, and this trend may lead to some changes in the scope of certain future INSARR services. For example, it may be preferable to conduct some missions, especially to large reactors, in a similar manner to OSART missions.

Other Missions to Research Reactors

34. Several other safety related missions have been carried out to assist Member States in the licensing of new reactors, or to help in evaluating planned or ongoing refurbishment projects. These were carried out mostly within the framework of the Agency's TC projects. Two such missions in 1998 visited Libya and Thailand, the latter in connection with reviewing the Preliminary Safety Analysis Report for the planned new reactor.

35. Work on the RA research reactor at Vinča, Yugoslavia, has been reported to the General Conference (see GC(41)/INF/5, GC(41)/INF/8 and GC(42)/INF/6). A further extrabudgetary visit to the reactor is scheduled for later this year. The pool cleaning process is now fairly advanced, and the visit will review progress so far and the technical plans for the handling and examination of the stored fuel.

The Assessment of Safety Culture in Organizations Team (ASCOT) Service

36. The ASCOT service became available in 1993. Its main purpose is to promote and support safety culture self-assessment and improvement by organizations in Member States. Three ASCOT service options have been offered to Member States:

(a) Expert support and advice prior to and following self-assessments;

(b) ASCOT reviews, which may be combined with, for example, ASSET reviews or other safety review missions, and

(c) Standard ASCOT seminars — covering the safety culture concept and methods for assessing safety culture — and expanded ASCOT seminars, covering a wide range of operational safety topics and highlighting best practice worldwide.

37. Two ASCOT seminars have been held during 1997–1998; at Bohunice, Slovakia, and Point Lepreau, Canada. A Safety Reports Series publication: "Examples of Safety Culture Practices" has been published, and another publication on "Developing Safety Culture — Practical Suggestions to Assist Progress" should be published in the near future. A meeting on "Safety Culture Self-assessment Highlights and Good Practices" produced a good review of the development of self-assessment methods, their application and results; the results from this meeting will be documented and made available to Member States.

38. In the coming years the Agency will devote increased effort to issues concerning safety culture. In order to promote safety culture and critical self-assessment in all organizations concerned with NPP safety, efforts will be concentrated on:

(a) Organizing ASCOT training seminars;

(b) Enhancing information exchange on experience with safety culture assessments;

(c) Collecting and disseminating information on good practices in safety culture;

(d) Reviewing and updating guidelines for self-assessment of safety culture, including specific guidelines for implementing safety culture in maintenance activities;

(e) Providing harmonization within the Agency and within Member States of the manner in which safety culture methods and practices are applied; and

(f) Identifying institutional factors which can lead to degraded performance and other organizational issues.

The International Regulatory Review Team (IRRT) Service

39. The period since the 1997 session of the General Conference has seen a significant increase in the number of IRRT missions completed and in the demand for the service. Missions to Bulgaria, Romania and Slovakia were conducted between November 1997 and March 1998 and preparations are in progress for missions to Ukraine and Switzerland before the end of 1998. A pre-IRRT visit to Pakistan has also taken place. A number of other Member States from Asia, South America and Europe have indicated that they wish to invite a mission during the next two years and others have expressed an interest in the service.

40. The purpose of the IRRT missions was to review the effectiveness of the relevant regulatory bodies and to exchange information and experience in appropriate, predetermined areas, such as regulations and guides, the licensing process, requirements on applicants and licensees, review and assessment during the licensing process, regulatory inspection and enforcement, and radiation protection. Specific recommendations for further improvement were made in each case. The missions also typically included visits to one or more of the facilities regulated.

41. The experience gained during the completed missions and the new Safety Requirements document on legal and governmental infrastructure have been used to revise and update the IRRT guidelines. This revision has strengthened the link between the service and the Agency's standards, and the original scope has been expanded to include radiation protection, radioactive waste management and decommissioning. The IRRT service now offers a flexible modular approach where the scope of a mission can be adjusted to suit particular circumstances.

Radiological Assessments

42. In recent years, the Agency has carried out several radiological assessments of sites affected by residual radioactive material from accidents, from past waste management practices and from past nuclear explosions (e.g. nuclear weapon testing):

- At the request of the Government of Belarus, and in co-operation with the Institut de Protection et de Sûreté Nucléaire (IPSN), France, the Agency formulated an international project on the environmental impact of the Chernobyl accident. The report, which describes the present situation and the expected future developments, was presented at the International Conference "One Decade after Chernobyl: Summing up the Consequences of the Accident" in 1996, and will be published in the near future;

- The International Arctic Seas Assessment Project (IASAP) investigated concerns over the potential health and environmental impacts of radioactive waste dumped in shallow waters of the Kara and Barents Seas. The results of the project were summarized in GC(41)/INF/5 and were submitted to the Contracting Parties of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Convention 1972);

- An international assessment of the radiological situation at Bikini Island, and the prospects for return of the population evacuated from the island in the 1950s, was carried out at the request of the Government of the Marshall Islands. The study is described in an IAEA Radiological Assessments Series report, and the main conclusions were summarized in GC(41)/INF/8;

- An international expert group reviewed the situation at the Semipalatinsk nuclear testing site, at the request of the Government of Kazakhstan. The group's main findings were summarized in GC(41)/INF/8, and a report in the Radiological Assessments Series will be published in the near future; and

- The international study on the radiological situation at the atolls of Mururoa and Fangataufa, carried out at the request of the French Government, was completed in 1998, and is described in GC(42)/INF/3.

43. The IAEA participated in a Semipalatinsk assessment and programming mission to Kazakhstan in June–July 1998, organized by the UN Development Programme. The mission, which included a number of other UN agencies, international non-governmental organizations and national experts, reviewed the situation and considered the need for future actions.